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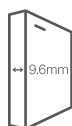
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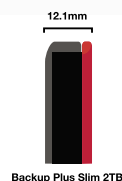
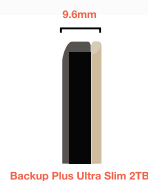

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Popping my Apple cherry

As unbelievable as it may sound, I haven't spent a significant amount of time on an iPhone. Ever. Yes, until recently I was an iVirgin. Sure, I've dipped my err stick in the Apple ecosystem a few times before – an iMac for a while in 2012, and one of the very first iPads as my only computing device on a rather long offsite assignment back in 2013 – but never the iPhone specifically. My interaction with every new iteration of the homogeneous device was limited to the few minutes of “ohh so this is what the gold iPhone 5 looks like?” followed by the usual “Meh”.

Over the last couple of months however, I've had the pleasure of using the 128GB iPhone 6S Plus. Having used it as my primary mobile communications device, I've had the chance to come to some really solid conclusions not only from the tech standpoint, but also from the socio-cultural perspective. As you might imagine carrying around a ₹92,000 phone has peculiar effects on how you are perceived by people. I'll keep this bit reserved for another rant and for now just focus on the technology aspect.

So what's my verdict about the phone? It's an absolutely brilliant device with an utterly ridiculous, almost castrated UI. Most people who come to this conclusion make the mistake of saying it's the operating system that is bad. This is not necessarily accurate because iOS, for whatever its interface handicaps may be, plays quite well with the underlying hardware; as it evident from its battery life and smooth operation. It's the uppermost layer that I have a problem with.

What's so wrong with iOS on the usability front? Where do I begin!

Apple seems to have a dogged desire to keep things simple. That's not such a bad goal to aspire to, but when your penchant for simplicity crosses over into downright dumbing down of things, it's something to worry about. Take the home button for instance. I'm sorry but making me go tick-tick on it twice to bring up multitasking just seems moronic. This brings me to another issue – what's with not having a back button? People defending this design philosophy will say that apps are coded to have their own contextual back buttons.

Yes they do. But hardly ever in the same place! Sometimes a close button appears at the top left (for eg while playing a video in the Facebook app) and sometimes a “Done” appears on the top right. Why should these buttons be placed at the top? iPhones certainly aren't getting any smaller (oh wait they are!). If sometime in the future Apple decides to have a back “feature” I'm pretty sure they're going to find a convoluted way of implementing it, all in an effort to adamantly stick to their precious solitary home button. Who knows, maybe they'll make you go tick tick tick thrice on the damn thing.

I think the reason Apple comes up with these absurd workarounds is because they have a tendency of making proclamations that'll come back to bite them later. Remember how Apple stubbornly refused to have a two button mouse for the longest time? Tell me, is “control clicking” to bring up contextual menus seriously more intuitive than having a right click right there on one single input device? The home button seems to be one of those things where they've dug their heels deep.

Since the time I've been using the phone I've been quite vocal about reporting my experiences on social media. On one such post, I had a fanboy come up and declare “the only people who hate Apple are those who hate simplicity and reliability.” Well, butter knives are simple and reliable. But if someone were to give me a Victorinox and it just happens to have a butter knife as one of pull out blades, I wouldn't complain. That's exactly what Android feels like to me – an OS that delivers your basics along with complex tools for those who want them.

On the reliability bit too I'm not entirely convinced. You know that thing they say about how Apple products “just work”. Well they do... except when they don't. On the very first run the iPhone gave me trouble by going into this get-install loop while downloading apps (a known issue: <http://dgit.in/ApplAppSt>). How'd I fix it? A restart of course! Not very different from the “when all else fails, restart” model we follow for other tech products right?

Don't even get me started on that mess of an application they call iTunes (at least on



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“When your penchant for simplicity crosses over into downright dumbing down of things, it's something to worry about.”

Windows). The whole process of transferring music onto the phone is so daunting, I've been procrastinating more than my usual share. But I'll leave that for another rant for it's now time to wind up.

The phone does have a few things going for it though. The hardware obviously (brilliant camera for instance), but on the software front too I like that the apps are better built. Perhaps the result of stricter quality standards imposed by the App Store.

Either ways, there you have it – a blow by blow account of an iVirgin's deflowering. You know where to send your hate mail. But remember to be gentle, it's my first time :-)

Let me know at:
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T(M)IFU



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“Technology helped us find a location but at the same time dissuaded us from completely trusting its claims”

This past month was a comedy of errors for me. You see, I’ve been planning a family vacation for a couple of months now. Everything from booking train tickets, hotel accommodations, cab bookings, and whole lot of fun and anxiety that comes along (in equal measure) when you’re about to travel with more than 10 family members who all have differing agendas as far as having fun is concerned. Obviously, thanks to technology, online apps and services like AirBNB, OYO Rooms, IRCTC and Google Maps came to my rescue. Tech was indispensable in these scenarios, proving to be a lifesaver: when comparing and contrasting on the best locations to stay at, listed prices, discounts, and planning other activities.

However, as far as the title of this column’s concerned, I did suffer from a few blonde moments. More than my usual quota. Combine that with a few tech bloopers, this month turned out to be memorable one for all the wrong reasons. Let me elaborate.

Zeroing in on an accommodation proved to be more difficult than I thought. Quite a few desirable locations we would’ve booked in a heartbeat turned out to be unverified properties on both AirBNB and OYO Rooms. Technology helped us find a location but at the same time dissuaded us from completely trusting the locale. Relying solely on technology as we were, there was no workaround to this impasse, and we had to look elsewhere.

Strike one. Inconvenience level = minor pain in the temple.

Finally, after settling on an alternative temporary vacation house, I was glad to find out the owner lived here in Mumbai itself, an elderly lady who seemed to be quite tech-savvy given her responses. After exchanging a couple of messages, I fixed up a time to meet with the elderly lady because I wanted to ask her opinion about the place we were visiting and also request a few things to be available in advance at her holiday home that we were occupying. I thought the personal connect may help reinforce my case, so I fired up Google Maps and asked my cab driver to take me to the desired location.


Reaching it proved to be nothing short of a nightmare as all it took to confuddle Google Maps was one section of the road being blocked and cordoned off for municipal repairs. Recalculating an alternate route seemed to throw off Google Maps completely, taking me from a potential 15 minute drive to a tiringly arduous detour of over 1.5 hour.

I had to ultimately cancel my visit, fixing up an appointment for another day. I lost both time and money thanks to technology that failed me right when I was counting on it the most.

Strike two. Inconvenience level = major pain in the derriere.

The final straw in my month of technology-related misfortunes was when I got locked out of my Gmail. Here’s how that unfolded: You see my Google two-factor authentication has been running for a couple of years now, where I get a part of my Gmail authentication code through SMS. However, last month, I switched to Google Authenticator which is an app you install on your phone, making your phone critical to generate the authentication code – there are no backup SMSes in this scenario. However, I installed the app on the iPhone 6S Plus that I was using temporarily and forgot to delink it before I factory restored the device. Big mistake.

I couldn’t log into my personal Gmail account on the phone, I had no codes SMSed to me every time I tried logging in, and I hadn’t made a copy of the backup codes the very first time I had enabled two-factor authentication on my Google account. Restoring access to my account now depended on talking to a human Google representative through my registered alternate email. This could’ve been a long drawn out affair, with my account being potentially inaccessible for several days, possibly weeks. However, for a moment of laziness for which I’m thankful now, I had clicked the “Stay signed-in” box on my personal laptop’s Chrome session. No permanent damage done, just half-a-day’s anxious thinking. I definitely dodged a bullet here, one that could’ve potentially logged me out of my account for an embarrassing amount of time to avoid notice. Strike three was the softest of the bunch. Phew!

Now you know how last month turned out to be a TIFU for me. Partly because of my own fault and in some measure due to technology’s niggles, too. How has technology failed to live up to your expectations, and how have you been comically inconvenienced by your over-reliance on technology and your expectation of it to just... work? You know where to reach me. 

Let me know your thoughts on this column at: facebook.com/jayesh.shinde | [@jshinde](https://twitter.com/jshinde) | jayesh@digit.in

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Contents

QUICK NAVIGATOR

001 ENTER

018 DGT
Desire
Greed
Temptation

032 DIGITAL LIFE
Geek Life
Origins

044 SCI TECH
Tomorrow's Tech
Space Age
From the labs

054 STREET SMART
Agent 001
Top 3
Killer Rigs
Price Watch

059 TECH@WORK
Industry Connect
Smart SOHO

065 WORLD VIEW

069 DEVMORX

073 TOOLBOX
Tips and Tricks
Workshop

106 ESC
Unwind
Community



82 Human 2.0

The evolution of our species might, for the very first time, be done on purpose

Lessons from Fiction 86

A short look at how popular fiction has covered genetic engineering



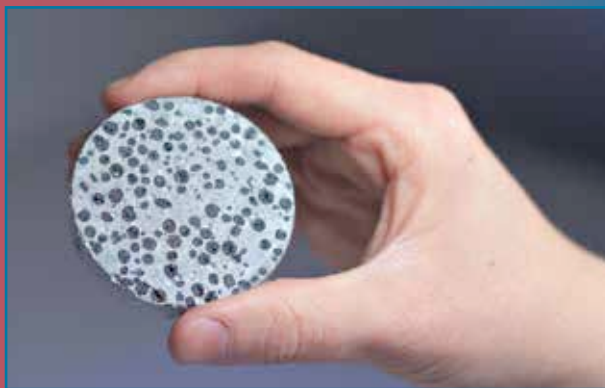
93 XIAOMI MI 5
Five for Fighting



95 APPLE IPHONE SE
The last of them



96 SONY MDR-XB650BT
Much improved, still more to do



44 Self Repairing Materials

Would you like it if your gadgets could heal just like the Wolverine?

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47 The ripples of Gravity

The discovery of gravitational waves and it's immeasurable significance.



50 The gift of sight

Vision processing units are helping unlock a whole new frontier in digital machines.

GDC 2016 SHOWCASE

digit
DVD

LINUX DISTROS
LINUX PACKAGES



101 SAMSUNG GEAR VR

Prepare to look stupid in public



102 ASROCK E3V5 WS

When reliability takes precedence

ON THE DVD

GDC 2016 Showcase

This year's Game Developer's Conference saw developers present the current state of game development across all gaming platforms, where the future of VR Gaming looked promising. Catch all the announcements and news about the upcoming games presented by the following game engine development studios.

- CryEngine
- Unity Engine
- Unreal Engine

Linux Distros

- Arch Linux (x86_64)
- Ubuntu (x64)
- Solus (x86_64)

Linux Packages

- Adobe Reader
- Autokey
- avast! Linux Home Edition
- Bacula
- BIND
- BitTorrent
- CloneZilla
- FileZilla
- Geany
- GIMP
- GParted
- Hardware Monitor
- Inkscape
- LibreOffice
- LMMS
- Midnight Commander
- Midori

- Net-SNMP
- PeaZip
- Pidgin
- Rootkit Hunter
- Synapse
- SystemRescueCd
- Tor
- whois
- Wine
- Wireshark
- Xampp
- XnView

Games

- Arcade Space Shooter
- Blurr
- Exploration Rover
- Light the Dark
- Project Generate
- Recycling Hero
- Terror Bird Feeding Frenzy
- Throw Junk at Aliens
- UnderTale Multiplayer
- Why Bother?

Biology Lectures

- Circulatory and Pulmonary Systems
- Hemoglobin
- Red blood cells
- The Lungs and Pulmonary System
- Evolution Clarification
- Intelligent Design and Evolution
- The Kidney and Nephron
- The Neuron and Nervous System
- Species
- Viruses



Nostalgia

This month I took a trip down memory lane. It started with my NAS drive failing me, and thus needing me to run out and buy another backup drive to safeguard all my data. I have years of pictures on that thing, and now I have two copies of everything – I learnt my lesson after that silly 3 TB NAS started clicking away.

Even though I bought a 6 TB backup drive now, I couldn't help look through all the stuff I'd backed up over the years. I'm a digital squirrel, and thus, I have everything. Literally. From old outlook PST backups from 2003, all the way to research done for my first few articles for Digit... pictures, games, music from the days when MP3 collections were things to be shown off... you name it, I had it.

I spent a good hour or so looking at the older DVD interfaces we had, and for the life of me I can't remember why we switched to this horrible iPad looking one. (Note to self: remember to sit down soon and finally get it changed to something less ugly.) There was a lot of reminiscing as well, and I was transported back to the two months I spent at office (barely going home four or five nights in that time) building the Windows OS looking interface.

Most importantly, I rediscovered my game backups (CD-rips; because CDs used to get scratched). There sat the good old NES emulator. Obviously I had to fire up DOS-Box and Nestopia and play *Super Mario Bros* for a couple of days – versions 1 and 3, because *Super Mario Bros 2* sucked! Then it was *Contra* for like a few hours (I got bored once I got the old skill level back and stopped dying even on speed runs), and then I saw AOE.ISO!


Not only did I have the original *Age Of Empires*, I also had the updates stored there, with the *Rise of Rome* expansion! That was it. I don't remember anything for a week after that, it was just binge-playing AOE every minute of free time I could spare, and also late into the night, because sacrificing sleep for AOE is just how we did things back in the day. I do miss those crazy LAN battles – we used to play with instant build and resource cheats allowed to make the game more interesting, and boy was it fun to hear the clackity-clack of furious typing when you started attacking a friend's town, and he realised he had run low on some resources! Ah, the good old days.

Another blast from the past I had this month was news of the Vivaldi browser being launched by the original guys behind the Opera browser. As a really old Opera user, who'd all but forgotten about Opera, Firefox and IE, I'd resigned myself to forevermore using Chrome. Although Vivaldi uses the same Chromium platform that also powers Google Chrome, it's also got all the best things about Opera. For a mouse user like me, just getting native mouse gestures back in the browser is a good enough reason for me to be loving it.

It's got its fair share of niggles and bugs, but it's nothing deal breaking for me, to be honest. I don't yet know whether it's my blast from the past mood this month that's got me loving Vivaldi, or a genuinely well-built new browser, but I've taken the plunge and set it as my default. I really wish the almost daily updates could be incremental, instead of me having to download the whole ~40 MB installer everyday. Though in this day and age, 40 MB doesn't really seem like too much anyway... try it out and tell me what you think.

I certainly encourage you all to take a trip down memory lane and revisit and play some retro games, reinstall your favourite old software (on a virtual machine), etc. Even if you are way too young to remember the old games, I still encourage you to give them a go – they can be incredibly addictive and fun. AOE, especially, is super fun to use cheats in, and get laser-firing troopers and cars with a nuclear rocket-launcher killing cavalry and foot soldiers! Talk about overkill...

Another game I've often gone back to playing is *Ascendancy*, which is a really old turn-based space strategy game. Maybe it was because I loved the idea of space exploration that I got hooked on it, but whatever the reason, that's another game I play for days on end about once a year. Then, of course, there's good old *Quake III*, which is a Team Digit staple for a quick competitive round of fragging to blow off some steam.

I'm sure we all have some retro games or habits, and I'd love to hear what yours are. So what do you do when you're in a nostalgic mood? 



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"There sat the good old NES emulator. Obviously I had to fire up DOS-Box and Nestopia and play Super Mario Bros for a couple of days"

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Taitra	17
TPLink	19
RDP.....	37
INNO 3D.....	39
India Antivirus	119
Quantum.....	120

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 Xiaomi Mi 5
 Apple iPhone SE
 Sennheiser Momentum 2.0
 Xiaomi Mi In-Ear Pro Headphones
 HP Pavillion X2
 Sony MDR XB650BT
 Mi Bluetooth Speaker
 Gionee Elife S6
 Lenovo Vibe K5 Plus
 ASUS ZenBook UX303
 ASRock E3V5 WS
 Kingston UV300
 Gigabyte BR1X N3000
 Biostar Z170 Racing GT7
 Samsung Gear VR

Mini Comparison Test - Inexpensive TVs:

Vu Play Series 50inch FHD TV
 InFocus 50inch FHD
 Intex 49inch FHD

Comparison Test - Repeaters:

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 D-Link DIR-505
 D-Link DAP-1320
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 Edimax EW-7438RPN Mini
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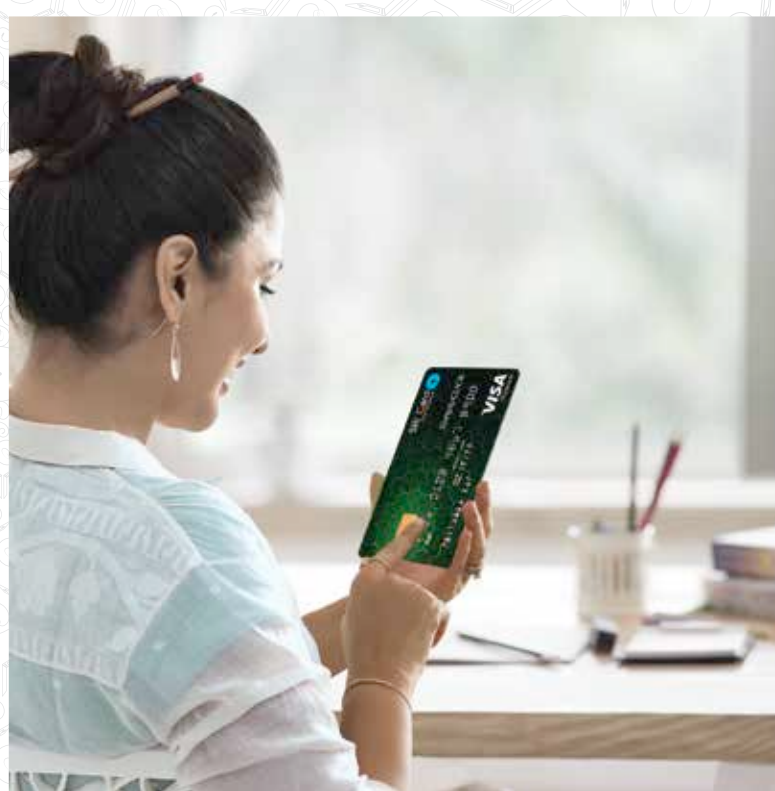
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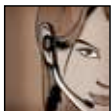
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support with
64-bit LTE True
Octa-core™ SoC

MEDIATEK

everyday genius

True8Core



Outstanding performance from
64-bit octa-core CPU

Vivid, fluid and responsive display

Professional-quality photos
and videos with instant focus
and super slow motion

Extreme speed and connectivity

Computing

- ▶ 64-bit Octa-core running up to 2.2GHz and features the company's CorePilot™
- ▶ Imagination PowerVR Rogue Graphics Core
 - High-end performance GPU, clocked at up to 700MHz
 - Support OpenGL-ES 3.0 & OpenCL 1.2 Dual-channel LPDDR3 running at 933MHz for top-end
- ▶ Integrated, low-power hardware support for H.265 Ultra HD (4K2K) video record & playback

Multimedia

- ▶ Integrated dual ISP, supporting up to 20MP@30fps
- ▶ Industry-leading H.265 Ultra-HD 4K2K 30fps video record/playback
- ▶ Hi-fidelity, iPhone5-class audio quality, achieving 110dB SNR & 90dB THD
- ▶ Higher than retina-resolution, Quad-HD (2560x1440) @ 60fps display support

Networking

- ▶ LTE/UMTS/TD-SCDMA/EDGE Modem Integrated
 - FDD/TDD LTE R9 Cat-4 (150Mbps/50Mbps)
 - DC-HSPA+ R8 (42Mbps/11Mbps)/TD-SCDMA Rel.7 (2.8/2.2 Mbps)
- ▶ Support Wi-Fi 11ac/BT/FM/GPS/Glonass/Beidou/ANT+

DGT

All the latest lifestyle technology, gadgets to drool over and gizmo porn like never before. Desire, Greed and Temptation ahead...



Facebook Messenger

Facebook Messenger now allows you to make group calls with upto 50 people. <http://digit.in/FBMess50>

✉ I am very happy to go through the two booklets on $E=MC^2$ and String Theory brought out by you. Apologies for reacting to them so late. I have been very interested in astronomy and physics right from my childhood and though I landed up being an engineer and designer of machines at Voltas Ltd, my basic interest never left me.

I have come up with a hypothesis on the formation of universe which, I find, answers a lot of questions which the scientific community has been working on. This is an original work and you might find it quite intriguing (always the case with something literally out of the blue / and black?)

If you feel it is worth your look and bringing out in another of your magazines issues, I will mail it to you. Kindly let me know.

—G D Sahai

✉ Hello Mr Sahai,

I can't promise that we will publish anything that's not peer reviewed, but we're more than happy to give it a read and send you a layman's perspective as feedback.

—Robert

✉ Hello Team!

First of all, I would like to say a thank you to all of you for making this tech-mag sooo impressive!

I am a commerce background student currently working in the finance sector. I've been a fan of Digit since Jan'13. No words are enough to appreciate your work. HIGH FIVE for the endless information you supply!

Since I belong to finance background I wanna say that technology and its impact is so vast that I find it has proliferated into almost all corners of the finance sector. This is the basis for my first suggestion: It would be great to see some fine article on the effects of technology on the finance sector.

Oh wait, one thing to share: I love gaming!

I get very less time to play games even on my phone. It's one of those sad things that happens after getting a job. I liked Feb issue of SKOAR! where you guys

Feedback for the April 2016 issue of Digit



spoke about famous game developers. I like that idea. And here is my another suggestion: is it possible for you guys to post some short interviews of game's lead cast say for example? Tomb Raider voice cast, Dead island cast and many more. This may help us to know how our favourite game's cast spend their time on gaming or what they think of gaming. And this suggestion is not limited to only cast, it also includes developers too. *phew* asking too much huh?

Time for appreciation: specially for content on main mag. It always brings us something new. Some things go over my head *lol* coding specifically.

Posters have always been cool! I wanna ask you is there any game similar to Dead Island Epidemic? Man... that game you provided in DVD... It's been my best companion after hours of study! Since that game is no longer in operation, I want something to occupy my time. Kindly provide any cool game like that one.

Time to end the conversation for now. Here I wanna say a huge thanks to all of you for keeping our lives technically fresh for whole month. Keep up the good work going. For now work is calling! Take care, do well, rock on!

—Apurv B

✉ Hi Apurv,

Yes, the financial sector has a lot of technology but since we cover it from a consumer perspective, there is limited content that we produce for the same. We are currently brainstorming the idea of machine learning in the finance sector. Prasad is working on bring that story to life. You can keep reading the Digit magazine and log on to digit.in for the stories.

It's a part of life that once you start working, you usually have to give up on a hobby or two. But don't give up on gaming. It's a great pass time and will help keep your reflexes in check :-). Yes, we did pay tribute to some game developers we have looked up to for quite some time. Was there anyone that was your favourite game developer?

Yes, we would love to conduct interviews with the voice cast of game characters and game developers. We have conducted such interviews in the past but as you are probably aware, it is difficult to get access to the developers, publishers and the star cast of a game, the ones produced internationally at least, but we do try. We have published a few interviews in the past though.

There are a bunch of games like Dota 2 (all hail the king of MOBA games), SMITE, LoL that you could try.

डिजिट अब हिंदी में

देश का सबसे लोकप्रिय और विश्वसनीय टेक्नोलॉजी वेबसाइट डिजिट अब हिंदी में उपलब्ध है। नयी हिंदी वेबसाइट आपको टेक्नोलॉजी से जुड़े हर छोटी बड़ी घटनाओं से अवगत रखेगी। साथ में नए हिंदी वेबसाइट पर आपको डिजिट टेस्ट लैब से विस्तृत गैजेट रिव्यू से लेकर टेक सुझाव मिलेंगे। डिजिट जल्द ही और भी अन्य भारतीय भाषाओं में उपलब्ध होगा।

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डिजिट



Eat Cereal in VR

Now you can eat cereal with a dead Egyptian queen in Virtual reality.
<http://dgit.in/CerealVR>



Golfer's wearable bestie

Garmin's Approach X40 is a new golf-oriented wearable which helps them track wearers' heart rates and more. <http://dgit.in/approachx40>

Thanks for writing in. It is because of letters like yours that we are motivated to write better content everyday. Keep writing to us with your feedback and suggestions and game ON!

—Sameer

✉ I am reading the mag since it was launched and it still feels great! You have been able to solve all my PC problems which is why the Q&A section is my favourite. Please do increase its pages.

As I lost my new 2TB HDD and even the data on it. I've seen many YouTube videos on changing HDD PCB but I'm scared to do it myself. Also here the PCB is hard to get. This is why I would like to read a cover story or fast-track on HDD crashes\its recovery\its repair\its maintenance\repair company etc.

—Neil D

4 Replacing the PCB only works if that's the faulty component. A hard drive going kaput may have a lot more reasons behind it. Perhaps there have been bad sectors that have lingered on for so long that the drive finally gave out one fine day. So you need to check using a diagnostic software like TestDisk and see if the disk parameters are the same as mentioned in the hard drive data sheet.

A few years ago, we tried this approach with two hard drives and were able to successfully recover data for a short session before the drive finally died and became totally unrepairable. Here's a link (<http://dgit.in/HddRprg>) to that workshop, it's still relevant to this day so there is a likelihood that you might be able to solve your problem. But we'd advise you to read up more about hard drive, their underlying technologies and the risks associated with different repair approaches. The knowledge of any topic is always helpful

As for companies that do this kind of work, there's Stellar recovery who have labs in Gurgaon. Whether to engage the services of professionals depends on how valuable that data was to you. To find matching HDDs from which to extract the PCB you can check out scrap resellers such as <http://www.jitubhai.com/>

—Mithun

LETTER OF THE MONTH

✉ Hi Guys! Hope all's going well! I'm Anirudha, a 16 year old and I have been a Digit subscriber for years now. I love to first read the articles from the magazine instead of checking the DVD. Let me start with the April 2016 issue of Digit. I liked Jayesh's column on finding joy in little things. Congrats, Jayesh about your daughter's learning in computer typing at such an early age! Ever since gaming consoles have launched, the PC or computer gaming space has slowed down. People play games on consoles rather than on PCs (even I prefer gaming on consoles). But every time I play the latest versions of the older gaming classics like CS:GO on PC, the memory of the past comes rushing back and how we enjoyed playing it with our friends like no other game (I still love playing CS:GO, by the way).

And wow the "The Evolution of Trolls" article was simply epic. The tips and tricks article was really helpful, too. Also thanks for the article about Realm. To be honest, the April issue is really awesome, and mentioning just how awesome it is really impossible for me. I like how Digit has been evolving since the past few years.

As far as the SKOAR magazine is concerned, it has all that a gamer needs. No kidding guys, but my room is filled with the posters included within SKOAR every month! I like that SKOAR mentions

newly released and upcoming games in the magazine pages, like Lego Marvel Avengers, Far Cry Primal, Tom Clancy's The Division, and also newly released smartphone games! They really help gamers decide which games they need to look forward to and buy. I really get excited every month about SKOAR!

Digit's Facebook page is also awesome with many Live events organized like first impressions and short review of newly launched products! All that I'm waiting for now is for the Digit E-Mag app to arrive thick and fast! Peace out!

—Anirudha Gorad



4 Hi Anirudha! Thanks for the kind words about last month's column. Watching kids grow up with all the fancy gadgets these days is truly a revelation. I don't completely agree with your assessment on PC gaming losing out to consoles, but smartphone gaming is where the growth and adoption of gaming has really exploded in the past 2-3 years. The Evolution of Trolls was a fun article for us to conceive and execute, and we're glad it's been so well received by all of our readers (like you). Yes, we do try to give a little bit of everything in SKOAR when it comes to diversity of gaming content. About Digit E-Mag, well, here's a little secret: <http://dgit.in/DigitEmag>

—Jayesh

✉ This letter is to everyone in the team. I am a fan of you all. I want to tell you that I love Digit, DGT, the DVDs and everything in the package. This is the first time time writing to you and I've been reading Digit for almost two years.

The things that I like are:

- The thoughts of R-S-J
- The changes that you have made in Dgt as some pages are useful for me now
- The smallest buddy in the family
- The Kuava Story U Mad Bro

My requests:

- Don't try to exclude the educational topics from DVD that you've been including for the last three months as it has made the DVD more valuable
- Can you switch to the subscriber packaging on newsstand as well because it will save paper and environment too and it doesn't have tape also
- Can you give the digital format of Posters (my favourite one)
- Don't give posters that are too dark
- Can you give the video of "how to make

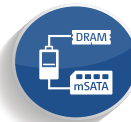
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ES1640dc

High reliability and flexibility enterprise-class storage solution

**Active-Active HA dual controller**

The dual active-active controller architecture ensures business continuity with near-zero downtime high availability.

**NVRAM modules**

Industry-leading random access performance from flash read acceleration and backup battery units (BBU) protected DRAM write cache.

**QES operating system**

The QES (QNAP Enterprise Storage) operating system, is based on the powerful and efficient FreeBSD kernel and the ZFS file system that have been proven through years of experience to be ideal for high-end enterprise applications.

**OpenStack cloud solution**

Supports OpenStack iSCSI Cinder driver and perfectly couples with HPE Helion for a combination of both high reliability and flexibility of future expansion.

**ZFS file System**

The ES1640dc features ZFS, a combined file system and logical volume manager, to support various advanced functions for high-end enterprise storage.

**Snapshots and SnapSync**

Snapshots and Snapsync greatly enhances a business's Recovery Point Objective and Recovery Time Objective.



iApps to go native?

Apple has announced for all the apps on the Apple Watch to go native by 1st June.
<http://dgit.in/NativeiApps>



SmartVR

Dodocase SmartVR is a handy and compact alternative to Google Cardboard
<http://dgit.in/dodocaseVRx>

robot" and one dictionary app?

- I am trying to learn coding and I also have registered on codecademy in the course HTML but the problem is that I am not able to understand what they are saying. I didn't know the A of coding can you help me where to start from?

–Vikram Kumar

Hi Vikram,

Some excellent suggestions and comments. I'll try to answer some of them one by one:

- Glad you like what Robert, Jayesh and I write in our columns. Our aim is always to try and satisfy your intellectual curiosity about diverse subject areas and provide food for thought.
- Assuming that the smallest buddy is dmystify. We're mighty happy about the response this little book of big thoughts has got. It's become the star of the package right?
- We'd love to have a minimalist packaging for the newsstand as well. We're working on it.
- We'll definitely consider putting the digital versions of the posters on the DVD (subject to permissions from the owners of the artwork of course)
- For starting with coding maybe try these two beginners guides will help: <http://dgit.in/BstProgL> & <http://dgit.in/StrtCdng>

–Siddharth

– Team Digit you are reborn this year. This time are doing a great job in making the coverpage attractive, and not only coverpage but the insides too. They are very informative. Nowadays I have noticed that you have added question papers with solutions and tutorials which are very useful for students who have opted for that subject. Another thing is that you are also including some informative articles like this time's Tips & Tricks which was based on YouTube. This was really useful. Another thing you could add is how to watch paid videos for free in YouTube which is kinda illegal but still... Your magazine is nice but still just like every gadget you have some pros and some cons. First is that when publish mag it is

quite outdated but still it is nice. Another is that the contest the 'meizu app contest' was over till I got the mag as it was in the April addition although the contest was in march. That's only what I wanted to say. Thank you and keep your hard work.

–Rudransh Panigrabi

Nice to hear from you once again Rudransh. You want us to teach you illegal stuff? You know we do everything by the book right? ;-)

The educational content on the DVD has been getting a lot of positive feedback so that's not going away anytime soon. Lastly we'll work on getting the logistics sorted in your area and ensure you get every issue at the start of the month.

–Siddharth

I am writing to Digit after a long time. The Troll cover story really got to me. I used to comment on my friend's and their friend's post rather unsympathetically. Well I know now how terrible I was. Thank you.

I have some requests as well:

- Articles on more Android apps especially games
- Reviews for games available for OSX
- Articles about weird tech products or inventions
- More stuff about fictional tech which became reality now (example Hoverboard)
- Most important: please provide download link for inside cover artwork of SKOAR. I love them.

–Mayur Gaikwad

You know the hoverboard hasn't become a reality yet right? But yes, excellent suggestions. We'll hide the artwork link somewhere in SKOAR. Nah just kidding here's the link: <http://dgit.in/skrartwrk>

–Team Digit

Hey Team Digit

The last few magazine editions were amazing. You guys nailed it with the Troll and Kanjoos Tech issues. This month marked the end of my subscription, but in just one year Digit has become a part of my life. That endless waiting for the 8th

of every month to arrive, which is when I receive my Digit copy every month, is an experience I would like to have all my life. As much as I love Digit as it exists, I want to make a few suggestions:

- You guys should really work on the DVD. After all the iPad interface does seem a bit outdated now, don't you think?
- You guys should also improve the email response service. I have sent about four-five mails to Agent 001 but I have received no reply to any of my queries yet. Look into it please.
- Please try to give setups of games that don't need Steam to play. Not all of your subscribers (myself included) have a fast internet connection. Spare a thought for them, too.

By the way, Siddharth and Robert bhaiya are my favourites. I do admire your hairstyle Robert bhaiya.. ;) Keep publishing Digit till eternity. Good luck and thank you.

–Ronak Makhijani

Thanks for the words of praise, Ronak. All of us here in Team Digit are also immensely proud of our recent issues, especially the Trolling (U MAD BRO!) issue. It was a story that all of us had great fun ideating on, shaping it and finally pouring it all out in the pages of last month's cover story. About your suggestion, what would you like the DVD to resemble? Yes, we apologize for the late response on some of our reader mail accounts. We understand that a lot of our readers are waiting for a response from the team before making a technology decision, and we're trying to speed up the our response pace, rest assured. Finding game setups that are independent of Steam and are still relevant for PC gamers is a bit of an uphill task. No, we aren't trying to give excuses, and promise to include some non-Steam related PC gaming installers very soon in the DVD.

Robert and Siddharth bhaiyas are blushing as I write this response to you. Rumour has it that once upon a time Robert had long, silky smooth hair. That's all I'm saying. Peace!

–Jayesh

2016

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and coming startups.

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TAITRA



GREED

For those who just want more than should be humanly allowed, we have enough to satisfy your hunger...

THIS MONTH: Roborace, Crusaders XJ-3100, Mansory Black Marlin Jet Ski, Aston Martin AM37, Ruark Audio R7, and a lot more...

TEMPTATION

If you're wondering what to do with yourself or how to spend some time getting cultured, this section is for you...

THIS MONTH: The Jungle Book, WWE Network, Must watch TV shows, and how to organize your very own tech-infused hipster party...

DESIRE > SHOWCASE

DJI M600

The eye in the sky for professionals

Drone maker, DJI, has announced its latest, most powerful drone to date, the Matrice 600 (M600). The new M600 is aimed at enthusiasts, professional aerial photographers and filmmakers, and it can also be used for industrial applications. Its main feature is the payload capability, as the M600 can carry a 6KG payload (camera) for 16 mins and a 5.5KG camera for 18mins, claims DJI. This will give filmmakers the ability to shoot with their own heavy professional grade cameras, such as RED cameras, with the help of the M600.

The DJI M600 features an A3 flight controller. This is a DJI developed, GPS enabled



flight controller that calculates all the different parameters required for flying with different payloads. It can accurately self-adapt and can be further upgraded to an A3 Pro system, which features advanced diagnostic algorithms. The A3 Pro is a little more advanced as it can collate data from three different satellites as well as in built sensors. The drone is also compatible with DJI's Zenmuse gimbals including the

Z15 series and the Zenmuse X series cameras.

The DJI M600 also has a new video downlink module, the Lightbridge 2, which can stream 1080p content at 60fps and can remain connected from a distance of three miles. It can achieve a max height of 2.5km (above sea level) and is available in two battery options. The price for the DJI M600 starts at \$4,599 (₹3,06,052 approximately).



Orbit

Skye Intelligence Technology's new auto follow drone is also a social sharing drone capable of precisely following and recording wherever you go. The Orbit drone is equipped with a patented auto follow drone technology which tracks using its SGIT tracking technology.

Wear the tracker, set the filming parameters in the app, frame yourself and the Orbit will keep you in its sight. Just give this baby a try, you won't be disappointed.

Link: <http://bit.ly/OrbitDrone>

X-Mini Evolve



X-Mini just entered into the wireless headphone

segment with the Evolve, an on-ear Bluetooth headphone which can also work as a Bluetooth speaker, selling for around ₹7k.

Skulpt Chisel



Using "electrical impedance myography", this device

will let you track and monitor your muscle quality and fat percentage across your body, to help you achieve your fitness goals.

Zepp 2



The second iteration of the Zepp multi-sport swing analyser is here and it wants

to help players improve their swing in baseball, golf and tennis, and probably cricket as well.

Mars



If you're setting up your home with a sci-fi theme and decor, Mars by crazybaby is a levitating Bluetooth speaker that resembles alien tech, with a subwoofer at the bottom.



10400mAh Power Bank TL-PB10400



High Capacity of 10400mAh



(500+) Recharge Cycles







Safety Protections



Dual USB charging ports

Bluetooth Music Receiver HA100

-  Bluetooth 4.1 pairing
-  NFC Pairing
-  Long-range wireless
-  Connects to any stereo supporting 3.5mm or RCA jacks



USB HUB

USB 3.0 4-Port Portable Hub UH400



- Connect up to 4 devices at a time.
- Data transfer speed 10 times faster.
- Built-in USB connector cable.
- Ultra compact design.
- No driver required.

USB HUB

USB 3.0 7-Port Hub with 2 Charging Ports UH720



- USB 3.0 ports offer transfer speeds of up to 5Gbps.
- 7 data transfer ports.
- Two exclusive 5V/2.4A charging ports

Charging Cable - Coming Soon

Charge And Sync USB Cable TL-AC210



- MFI Certified.
- Convenient length.
- Durable design.
- Apple Authorization Chipset.
- High quality tinned copper wires.

Hasselblad H6D

The legendary company has been reputed to make large, heavy medium-format cameras that offer a level of detail unparalleled by other cameras in the photography industry, putting most DSLRs to shame. The Hasselblad H6D has two new variants - a 50-megapixel one, and a 100-megapixel one. The new cameras feature a better, reworked image sensor, a new processor with increased buffer size that allows shooting at two frames per second, an autofocus system with minutely accurate subject tracking, a 3-inch 920K-dot display, 4K/2K video recording in RAW, and a multitude of ports including USB-C 3.0, mini-HDMI, audio I/O and dual-card slots - one CF and the other SD. All of these, particularly the touchscreen display and the USB-C port, keep it relevant in the connected mobile world of today.

At these specifications, the Hasselblad H6D can produce an incredible level of detail that will be impossible to spot from any other camera. Its massive dynamic range, along with the excellent sensor allows shooting of incredibly detailed images with near-perfect colours. The latest machine from the mighty



Swede is a real monster, and as such, costs a bomb. The H6D-50c is rated at €22,900, while the H6D-100c is at €28,900, all lenses and accessories extra. Upon direct conversion, the Hasselblad H6D-50c costs as much as a Skoda Octavia, an executive class D-segment sedan.

GoPro Omni

GoPro has unveiled its new virtual reality rig called the Omni. The device resembles a hollowed out cube with six GoPro Hero4 cameras, one for each side. The video from all six cameras are then stitched together to create a single 360 degree video. The company hasn't yet revealed the price of the device.

This isn't the first VR camera rig to be unveiled by the company. GoPro has earlier unveiled the Odyssey that used 16 GoPro Hero4 cameras. The difference was that the Odyssey is able to capture stereoscopic 360 degree videos, while the Omni can only record monoscopic videos. GoPro is also working on a drone called the Karma, which is scheduled to be launched this year.

GoPro isn't the only company to make 360 cameras. During the unveiling on the LG G5 in February, the company unveiled an accessory called the 360 cam that takes 360 degree videos with two 13MP wide angle cameras. Sony also showcased a 360 degree camera called the Xperia Eye during the launch of the Sony X series of phones. Nokia also has a 360 spherical camera called the Ozo, which was unveiled last year.



Kindle Oasis

Amazon has unveiled a new e-book reader called the Kindle Oasis. The new Kindle is priced at \$290, which is approximately ₹19,300. The company says that the device is over 20% lighter and 30% thinner than any other Kindle and weighs about 133g. The Kindle Oasis comes with a 6-inch display with a resolution of 300ppi, which is the same as the Kindle Voyage. However, the new device uses 10 LEDs for the built-in light as compared to six LEDs used in the Voyage.

The Kindle Oasis also comes with a leather charging cover and adds to the battery already built into the device. The cover will automatically charge the device and Amazon claims that users will get months of combined battery life. The Oasis also comes with a hibernation mode that minimizes power consumption when the device is inactive. The device also comes with dedicated page turn buttons.



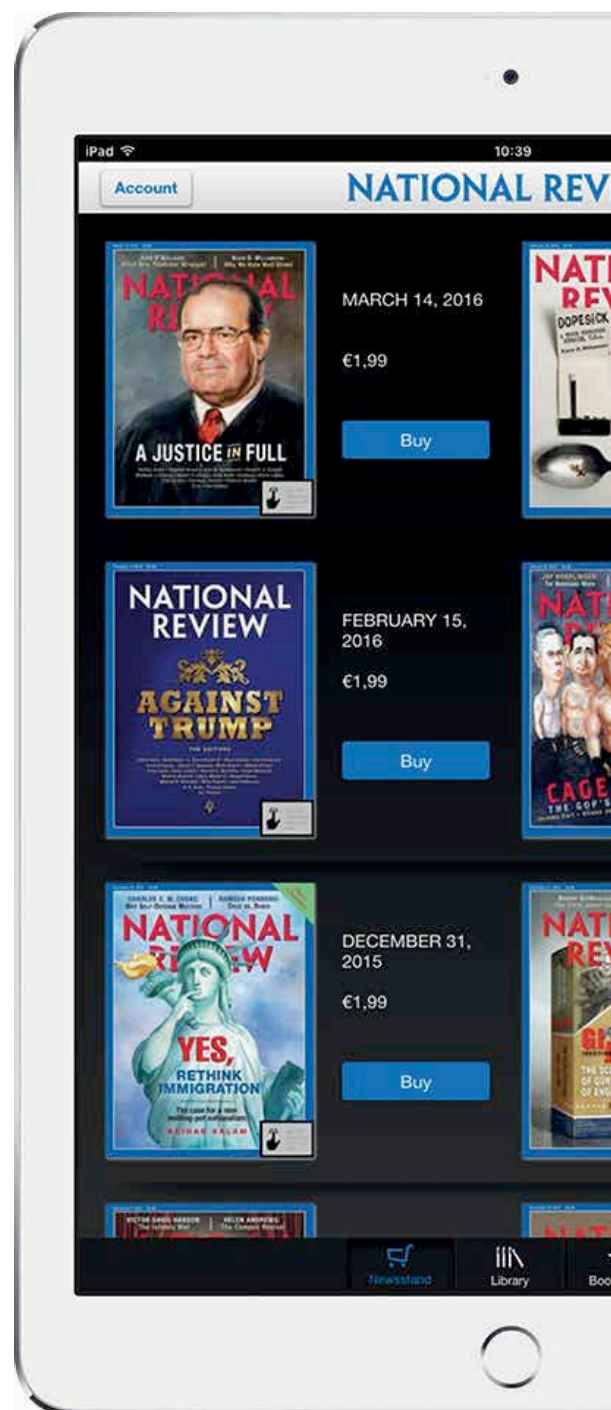
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Facebook Surround 360

Facebook unveiled a reference design for a 360 degree video camera that it plans to release on Github, as an open source project. Known as the Facebook Surround 360, the 17-camera system is shaped like a flying saucer and can capture and render images in 360 automatically. According to Facebook, its reference design solves a number of problems with VR cameras today and implored manufacturers to use its design for their own products.

Further, the reference design by Facebook, uses 14 wide angle cameras and three fish-eye cameras (two at the bottom and one on top). This, according to Facebook, ensures that the camera can capture all of its surroundings, without needing to show the pole that it's been mounted on. This is a very real problem in the current VR shooting systems. Facebook even presented a demo video, shot with the camera, using the Samsung Gear VR.

The company claims that the Facebook Surround 360 can run for long durations without overheating. It can shoot 8K, and videos can be viewed on Facebook, Samsung Gear VR and Oculus Rift.

Ossic X

VR headsets have become commercial and are already shipping to customers. While we have come a long way in improving and getting close to a perfect immersive experience inside the headset with visuals, audio seems to be left behind. The current VR headsets let you connect your own headset for audio but it's a point where the immersion breaks. Ossic headphones want to fill in the gap with their 3D headphone that promises to offer a more realistic audio experience. The Ossic X employs sensors added in the headphones that constantly measure the position of the head and ears. It makes use of head-related transfer function, which is a measure used to locate the source of a sound. Since the shape and size of everyone's ear differs from



one another, such a measure to adapt to the user's ears is necessary to emulate 3D audio. It uses multiple drivers to throw music from different areas of the cup to your ears. The virtualisation of the 3D audio is done through proprietary software adjusting to the anatomy of your ear where moving your head affects the sound output. The headphones connect to your PC using the standard 3.5mm headphone jack. Priced at around ₹26k, the Ossic X is directed towards VR gamers looking for a more immersive virtual experience.



Moodbox

Artificial Intelligence has come a long way where we already see autonomous machines pulling off incredibly complex tasks believed to be possible only by humans. Sitting at its heart is Emi, the intelligent machine that learns your taste in music you listen to throughout the day and in various weather conditions. As you listen to more songs, the machine improves on recommendations using its analytical algorithms, churning out music based on your mood or activity. It gets better. Apparently, it can even track your mood by analysing your speech. This is further improved by Moodbox asking you questions and in a way having a conversation with you. The device supports a multiroom setup so you will be able to connect multiple Moodboxes around your house to play the same song or different songs through each speaker. Fresh out of a successful Indiegogo campaign, there is no final word on its final market price, but one could acquire it by paying a cost of ₹10k.

Impossible Project I-1

Many attempts to reinvent a marvellous technology from the past, have only ended up with a half-baked attempt. The Impossible Project's very first camera, an instant Polaroid with digital frills, is far from that. In fact, it seems to have poised itself beautifully in the fine line of balance between the analogue instant cameras and wireless controls.

The Impossible Project I-1 has a flash ring surrounding the lens module, and uses a reverse-engineered custom Impossible type 600 instant film, inspired by the original Polaroid type 600 film that was discontinued eight years ago. On the outside, it looks extremely simple and organised. On the inside, it packs in a number of digital tricks. For instance, the 'advanced ring flash' can adjust its intensity based on the ambience and the focus distance of the subject. It also gets a rechargeable battery pack that you can charge via an USB cable, and the highlight of the pack is the companion app, which you can pair to the camera via Bluetooth and get full manual controls including shutter speed, aperture, flash strength, and even remotely controlling the camera shutter.

The package that the I-1 presents is incredibly beautiful, with a classic body accompanied by smart interiors. It becomes yet another product that highlights the beauty of the past, like the



Lomography Daguerreotype Achromat 64mm lens. The camera will premiere on May 10, and be priced at \$300. It will be sold online, posing a direct competition to the simpler lineup of Fujifilm Instax cameras.



Orah 4i

Orah 4i by VideoStitch is the first company to introduce live streaming content in virtual reality. The Orah 4i is not just another 360-degree camera, it can actually record and stream Full HD content directly to headsets like the HTC Vive and Oculus Rift.

This is a major breakthrough in the field of hardware supporting the rise of VR. We are already witnessing a rising number of apps and games that support virtual reality, engaging users within the arena of an event, be it a game, or a music concert. The mechanism is quite simple - Orah uses four, custom-built cameras with four individual microphones, to record audio and video from all directions. The aluminium-clad camera module is accompanied by a 'stitching box' - a Linux-based computer that stitches all the four feeds together to give you a unified feed of 4K resolution virtual reality video. Adding to this, the output format of the video is the same as the format supported by Facebook and YouTube, the major players promoting live video broadcasting on the Internet, to the masses.

The Orah 4i went up for preorders on April 6, and is available for \$1,795 (₹1,19,250) for a limited period, and peaks at an MSRP of \$3,595 (₹2,38,800). Sure, it is expensive for now. But then again, this is the first of a kind that will certainly see the world of imaging devices evolve in future.

DESIRE

TAKE MY MONEY!

Here is where we keep an eye on crowd-funded projects that will make you go 'Shut up and take my money!'



Nuheara IQbuds

Wireless earbuds are getting more and more trendy and Nuheara is one of the latest ones to join the bandwagon with its IQbuds. It was funded close to double in the initial 24 hours after it was listed on the crowdfunding website Indiegogo. Following the Bragi Dash path, IQbuds are a Bluetooth headset that pairs with your phone and let you enjoy your music along with active noise cancelling. What's different here is that the same technology is also being used to focus on voices

in noisy environments as well as give your hearing a boost, which this pair of earbuds boasts. Nuheara also claims it has the transparency feature so you can blend music and ambient for better awareness. The tap touch-controlled IQbuds also promise a four-hour battery life from its 100mAh lithium-ion rechargeable batteries and charging case adding twelve hours of battery life just like the Bragi Dash.

Link: <http://dgit.in/NIQbuds>

Lighty

Lighty is an Android-powered smart projector that promises to be a projector, mobile-cinema, a gaming device, an internet radio and a robot, all in one. This projector can adjust its tilt, project at any angle, move around 360-degrees on its own as well as manually and controlled through gestures. For instance, to turn off the projector, simply put your hand in front of the projector's light and it will go off. This mobile robotic projection system is equipped with a HD Laser pico projector that is capable of projection of 1280×720 resolution. The images stay sharp from 50cm to 5 meters and can go upto 20 feet in diameter, owing to its laser LEDs projection system. Its 5000 mAh battery is claimed to last for 3-4 hours of movie streaming and over 10 hours of Internet



radio playing. Want more? You can hook it up to any phone or tablet and it will also charge your phone along with projecting your phone's display. Complementing the great visual experience, are 2 x 6W

"nice sounding" speakers, unlike other projectors, says Lighty. Lighty can connect via WiFi as well as Bluetooth and is powered by a 8-core ARM CPU.

Link: <http://dgit.in/LightyProj>

CoWatch

Built by Android and Google veterans, on the face, the CoWatch looks just like any other smartwatch. It tracks your fitness, keeps you updated with notifications, comes with interchangeable watch faces, a heart monitor, and a long list. It is powered by a 1.2GHz processor, 1GB RAM, and 8GB flash memory under a 1.39-inch



AMOLED display. On the top it runs a custom Cronologics OS which is compatible with both Android and iOS devices. But none of those are headlining features, so why is this just another watch featured here? Where CoWatch stands out from the competition is its integration of Alexa, Amazon's cloud based voice assistant. The API integration allows the

smartwatch to do almost all of the same things as Amazon Echo. If you have already invested in Alexa or are saving up for the Echo, then laying your money down for the CoWatch is not a bad idea.

Link: <http://dgit.in/CoWatch>

DoDock

We have to admit that DoDock is one of the most fanciest docking station we've ever seen. The device has a minimalist streamlined design and has been designed specifically for Apple products, but can also charge other USB Type-C compatible smartphones.

This multiple charging station can charge up to 4 devices simultaneously, and allows users to switch between iOS and Android connectors easily. You get two connectors on the either side of the docking station whose wires have been carefully hidden inside the bottom and are easily replaceable. On the side you also have 2 USB charging ports in case you need extra ports. DoDock also has an RGB LED lighting system in its circular head with three different modes and levels of brightness. On the top right corner positioned is the smartwatch charging ear that houses in the Apple Watch charging station. If you are a pebble watch user, you can also buy an additional magnetic charging port extension for the Pebble Watch. The dock is available in silver, gold and rose gold colours to match your Apple products.



Link: <http://dgit.in/DoDock>

Fuzebox

Three years back, Fuze for Raspberry Pi, an education focused personal computer was launched and now has moved to Kickstarter with its latest launch, Fuzebox. The Fuzebox is a simple 'plug and code' solution and is powered by a Raspberry Pi which is designed to work alongside existing IT equipment. It claims to



be the most accessible coding device and can be connect via USB, WiFi or Bluetooth to your existing computing hardware to kickstart you to code. The educational tool edition supports Windows, OS X, iOS, Android as well as Linux. The bundle contains an electronic components kit, the Fuze IO board and the

breadboard, project workbooks and reference guides and fuze basic for Windows, Android and Apple. Fuzebox is laden with 17 different sensors along with a camera, a microphone and 8 Programmable Buttons for better project controls.

Link: <http://dgit.in/FuzeBox>



Aurai

Ever had an eyegasm? Aurai is an eye-relaxing device that helps to decrease eye-aching caused from hours of staring at various screens. Resembling a head mounted VR device, this device comes with dual modes to relieve the eye-stress using the power of just water. The Cool compress mode focuses on regulating the blood circulation around your eyes and relieves strain. The Warm compress stimulates the oil glands and helps prevent clotting, which helps your eyes relax. While other eye massagers work on the principle of vibration, Aurai comes with its water transmission technology which regulating the temperature and the water circulation waves to massage your eyes. The result is a fresh feeling eye. **Link:** <http://dgit.in/AuraiEM>

DESIRE

MOBILE WATCH

Stylish, glamorous and interesting smartphones are always on the horizon. We take a closer look at what's hot in this space...

Zopo Speed 8

Thought octa-core processors and 3 gigs of RAM were completely overkill on a smartphone? This Chinese company doesn't believe so. The Zopo Speed 8 has an attractive design and good build quality which makes it very attractive looking but when we talk about the prime feature of the phone which is the Deca-core processor it is claimed to be the first phone launched in the world with this processor by the company. This smartphone is a high-performance device, listed for ₹19k approx at their official website. More info [<http://dgit.in/Zopospeed8>] and [<http://dgit.in/Speed8Official>]



SPECIFICATIONS

Display: 5.5 at 1080 x 1920 | **Processor:** MediaTek Helio X20 | **Memory:** 4GB RAM + 32GB ROM | **Camera:** 21MP back + 8MP front | **Battery:** 3200 mAh | **Connectivity:** NFC, Bluetooth, GPS, 3G, 4G, WiFi, Hotspot, Type-C | **Sim:** Dual SIM

Alcatel One Touch Xess

Is your tablet's battery sustaining full day or dying very early? Alcatel One Touch Xess is a tablet which can solve your problems. This tablet comes with a 10,000 mAh battery making it a power pack. This tablet comes with a 17.3 inches LCD display with a 1920 x 1080 resolution which is big enough to play games or watch movies. With 5MP front camera and 3-watt JBL speakers, this Tablet is ideal for video calling. The biggest attraction for this tablet is the kickstand which provides it an incline of 30, 50, 75-degree angle making it absolutely handy to use. This tablet will be available for \$499 (34K) approx in the market.

SPECIFICATIONS

Display: 17.3 at 1920 x 1080 | **Processor:** MediaTek MT8783T clocked at 1.5Ghz | **Memory:** 3GB RAM + 32GB ROM | **Camera:** 5MP front | **Battery:** 10000mAh | **Connectivity:** Bluetooth, WiFi, FM Radio, NFC.



Nubia Z11 mini

Want to buy a phone with a decent price but want to click amazing pictures? Nubia Z11 mini might be the right phone for you. This phone with a 5-inch display has a 16MP rear camera and 8MP front camera making it pretty good for clicking pictures, rear camera has f/2.0 lens which offers phase-detection autofocus and "3D noise reduction". The prime feature of this phone is the RAW DNG shooting mode and ISO that goes up to 12,800. It's powered by a Snapdragon 617 chipset with 3GB of RAM and 64GB of internal storage which is enough for day to day requirement.

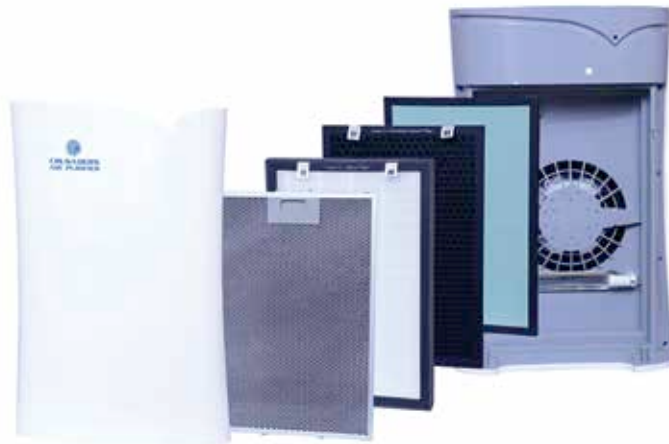
SPECIFICATIONS

Display: 5 inch at 1080 x 1920 | **Processor:** Quad-core 1.2 GHz Cortex-A53 & Quad-core 1.5 GHz Cortex-A53 | **Memory:** 3GB RAM + 64GB ROM | **Camera:** 16MP back + 8MP front | **Battery:** 2800 mAh | **Connectivity:** Bluetooth, GPS, 3G, 4G, WiFi, Hotspot, Type-C | **Sim:** Dual SIM (Nano-SIM, dual stand-by)

GREED

EXAMINED

Really cool products come to the Digit Test Centre which don't really fit into the standard product categories that we review in the Bazaar section. We write about them here mostly to make you turn green with envy.



UV Tube and Ionizers. All the filtration and purification is based on the principle of PCO (photo-catalytic oxidation) and in conjunction with the HEPA and Carbon filter, the entire assembly is able to filter dust, pollen, allergens, smoke, odour, bacteria, viruses and other micro-organisms, and toxic gases as well.

There are many buttons placed on the top panel of the air purifier that let you cycle through the different modes, control the fan speed, add a timer and put it to sleep. The complete package is said to run on only 43 watts while it guzzles down all the pollutants at your place. The air purifier did a really good job of a deodorizer. Other than that, after opening up the filters after a few weeks, the HEPA filter had acquired a lot of dust. It's difficult to determine whether the air purifier was capable of filtering out pollens and bacteria, it certainly displayed how the other pollutants are filtered out. The XJ-3100 doesn't come for cheap, selling at around ₹21k.

Crusaders XJ-3100

No matter how clean your home is, pollutants will always drift away in the air and potentially make you or someone in your house fall sick. We put the XJ-3100 air purifier from Crusaders to test in our labs to find out whether it made a difference. Meant for room sizes of up to 425 sq ft, the air purifier has a six-stage filtration process that includes a 2-in-1 pre filter mesh, HEPA (high-efficiency particulate arrestance) filter, Carbon filter, TiO₂ Photo-Catalyst filter,

I Am Magpie's Smart Selfie Stick

But first, let me take a selfie!

Nothing can stop you from taking selfies and groupies and it's the main reason more and more selfie sticks are surfacing all over the world. I Am Magpie's Smart Selfie Stick is a feature loaded selfie stick that promises to deliver more than what most of the traditional selfie sticks offer. Its body is made of aluminium alloy, combining both an element of style while being lightweight, weighing just above 160g. In terms of colour options, it has a silver and gold variant to match your phone.

The selfie stick comes with five segments with turn to lock mechanism. The phone holder on its top is quite sturdy and collapses when not in use, making it easier to carry. The 270-degree adjustable phone holder can conveniently hold phones with a maximum width of 8



cm, easily holding phones that have a 5.5-inch screen. This selfie stick can go from a pocketable size of 23 cm to as long as 97 cm when completely expanded, letting you click pictures from a minimum distance of 9 inches and a

maximum distance of 38 inches. However, to unlock the complete potential of this 'smart selfie stick', you need to download their 'BT shutter' application, available for both Android and iOS.

This app enables you to adjust the zoom levels as well as switch between front and rear cameras on-the-fly from the hardware buttons provided on the stick. The selfie stick comes with a 220mAh battery which takes about a little more than an hour to charge and will have enough juice to last through the day. The selfie stick can also act as an extension to your tripod as it can be easily hooked on to one, thanks to the tripod head mount on its bottom. To get this one, you will have to shell out ₹2k, which might be higher than competition but given its offering it's a fair price.

GREED

DROOL MAAL

Get your drool on and behold some of the fanciest, ostentatious and drop dead gorgeous things money can buy. Droolworthy?



Roborace

Roborace is a perfect blend of automobile and artificial intelligence with unstoppable force. Weighing around 998 kg approx, this product triggers all possible passion in our readers—motor racing, design, and advanced technologies. Roborace is a beauty even with the unusual challenge of not having any driver. According to reports, the cars could go as fast as 300 kilometers per hour making it the fastest self-driven cars in the world. The heart of the device is powered by Nvidia Drive PX2 making the device not only focus on providing entertain-

ment but also its primary objective which is competitive racing, therefore, the creators have made the perfect mix of stunning sharp design with high performance. This car is around 15 feet, 9 inches in length and 6 feet, 7 inches in width which clearly tells us it that this car is a big and heavy car. The Drive PX2 can manipulate inputs from radars, cameras, and various sensors, and help the car analyse its environment and respond to it. This might be the future of racing cars as driverless cars can highly bring down the casualties happened during the race.

Mansory Black Marlin Jet Ski

We all are aware what Mansory is famous for, modifying luxury cars and wrapping insanely expensive cars with carbon fiber layer inside out. But now Mansory has come up with Black Marlin Jet Ski. The designers have given this Jet Ski a new attractive aggressive look with full carbon body making it 10 kg lighter than a usual Jet Ski. This product comes with a 550 horsepower engine and is a large upgrade to the initial model which is Sea-Doo RXT-X 260 RS. Everything has been customised and modified but the main highlight of this Jet Ski is the seat which is the water resistant seat which has been made using artificial leather making it perfect for water sports enthusiasts. This jet is around 41 lakhs [approx] in price, which is obviously a lot but



totally worth it. Black Marlin Jet Ski is capable of handling three riders at a time and has a strong framework

with good balance to weight. So if you are a die hard watersport enthusiastic this is the right toy for you.



Aston Martin AM37

James Bond has always been loyal to Aston Martin, and now the luxury car manufacturer is entering into yacht territory. The AM37 was conceived in collaboration with Quintessence Yachts, which apparently has been under development for a long time. With an elegant design highly reminiscent of their incredible cars, the powerboat has a sliding deck made of three carbon fibre panels covering the cockpit. The rear deck is retractable as well that houses a sunshade. Being luxurious and stylish, the powerboat is indeed powerful with the high-end variant coming with a pair of 520-horsepower engines that could get you speeding up to 52 knots. The lighter version will house two 320-horsepower engines. The dashboard of the AM37 will instantly remind you of the insides seen in a DB-series Aston Martin car, and the controls can be accessed by a huge tablet sitting at the middle of the cockpit. It won't be a surprise to find Bond entering this powerboat after stepping out of his DB10.

Ruark Audio R7

The Ruark Audio R7 was a beautiful sound system and the company recently released an updated version. There aren't any significant changes on the design side but mostly on the inside to drastically improve the audio quality. The linear amplifiers and the crossovers have been improved resulting in a better integration of the coaxial stereo units giving you a wider frequency response. The system is both analogue and digital, so you'll be able to enjoy a vast range of radio stations and also a CD player to make you nostalgic. In terms of connectivity, it has an aptX Bluetooth receiver and DLNA Wi-Fi so you'll be able to stream music along with an option to connect a wide range of auxiliary devices such as a TV or even Google Chromecast Audio.



APP WATCH

Shiksha



Although picking the right career is a different ballpark of discussion, picking the right course can be equally daunting. Shiksha serves as an organised platform where students who wish to solve the heap of doubts they have regarding their career and education. It's easy to navigate inside the app, and once you go through the initial selection of courses and degree you prefer to know about, you will be served with discussions related to them. Apparently, the app consists of experienced professionals and faculty members from colleges, waiting to solve your queries about picking the right degree and college. The app also acts as an avenue to know more about exam preparations across several entrance tests.

Android: <http://dgit.in/ShikshaAnd>

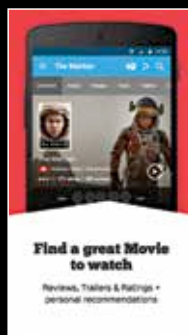
BabyBerry



Taking care of your babies isn't child's play, or is it? It becomes extremely difficult to maintain their vaccination cycles and medical records in an organised way, especially for working parents. But there's an app for that too. BabyBerry is trying to make parenting easier on their platform. After registering your child in the app, it gives you vaccination cycles and a feature to upload your baby's prescription and medical records. The Growth Chart lets you track your baby's growth in terms of height, weight and head circumference. Another interesting feature is Milestones where you can add the first time your baby spoke or the first walk. Parents can also browse through baby-related content and a list of specialists around you.

Android: <http://dgit.in/BabyBerryAnd>

itcher



Being a movie buff, you might go around exploring recommendations on the internet. Movies, books, music, video games, etc., require good research to find the best ones. Forums and threads about recommendations are always available but do not bring everything in one single location. Itcher presents you with suggestions for content based on your preferences across the above mentioned categories. Here, you'll get access to all forms of data related to a particular category, say, a movie's listing will present the entire cast and crew, posters and images, trivia, reviews etc.

Android: <http://dgit.in/itcherAnd>

iOS: <http://dgit.in/itcherIOS>

TEMPTATION

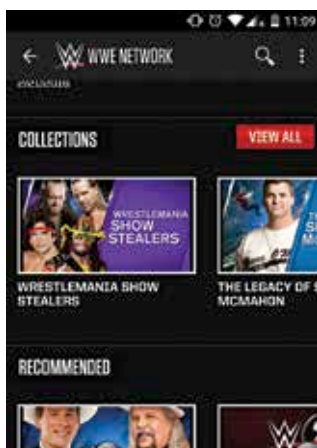
CRITIQUE

In this section, we put stuff through the grinder and closely examine what comes out; everything except gadgets, because there's more to life than just that

WRESTLING

A royal rumble!

WWE Network: Every fan's dream come true



For too many of us, WWE is full of fond memories. WWE Network brings most of them back! The great thing about WWE Network is that it's a Netflix-like monthly sub-

scription service (costing US \$9.99 per month) that gives you access to every video or show ever produced and broadcasted by WWE.

Yes, that means all the archived videos from the '80s, '90s and early 2000s pertaining to legends of the game that we all worshiped growing up are available for viewing – on your smartphone or desktop.

We largely accessed WWE Network's service through an Android app. Searching for particular videos related to WWE superstars was great fun, and the videos streamed quite well. Must try! Worth it.

Rating: ★★★★★

- Jayesh Shinde

MOVIE

Sweet nostalgia

The Jungle Book



If you fancy a trip down memory lane or if you're in for something a little fresh, then Jungle Book is accommodating towards both audiences. It's one of the few Hollywood movies with a person of Indian origin in the lead that doesn't make us Indians cringe. Neel Sethi plays the part of the feral man-cub quite well, making up for the poor performance that Dev Patel has a knack of feverently dishing out every now and then.

The animation is on an entirely different level setting a new benchmark for CGI in the movie industry. For those fortunate enough to have caught the movie on a good 3D screen along with Dolby Atmos audio, it sure

will be an experience that won't be forgotten anytime soon. While the 1967 Disney animation will forever remain entrenched in our hearts, we can easily see why a whole new generation might feel the same with the newer movie. With an excellent choice of voice actors from the likes of Bill Murray as Baloo and Ben Kingsley as Bagheera to Idris Elba as Shere Khan and Scarlett Johansson as Kaa, along with Christopher Walken performing as King Louie, it'll be really tough to best this casting in the near future. Though there is another Jungle Book coming out in 2018 with an equally stellar voice cast, so we're still pumped. We didn't check out the Hindi dub of the movie but we've heard they've done a good job with that as well. We are glad that Jon Favreau decided to not make the movie into a musical, and retained the charm of the 1967 version. Baloo's 'Bare Necessities', Kaa's 'Trust in me' and King Louie's 'I wanna be like you' are nice. Rudyard Kipling's seminal work is beautifully animated and the songs really complete the movie.

Rating: ★★★★★

- Mithun Mohandas

MUST WATCH



Marseille

Created by Dan Franck, Marseille revolves around the life of its mayor and is supposed to be House of Cards-like. A lot is riding on the drama in its eight-episode first season that is set to air worldwide on Netflix on May 5.



Below Deck Mediterranean

A derivative of Below Deck, Below Deck Mediterranean is about the lives of the nine crew members who work and reside aboard a mega yacht during a charter season in Greece.



Lady Dynamite

Lady Dynamite is inspired by comedian Maria Bamford's life, who has accepted to be "her life" in this series. The comedy series narrates the story of a woman who loses and later finds herself.

TEMPTATION

TTD

Bored out of your wits? Can't think of any fun thing to do? Worry not, we'll take that burden off your shoulders in our Things To Do section every month. Read on!

can help you be the DJ of your own party. This smartphone/Tablet application offers virtual turntables which are very easy to use and have good reliability. Download the application here:

Android: <http://dgit.in/edjingDJ>

iOS: <http://dgit.in/edjingDJi>



Buy your perfect speaker

Good, loud music is the heart of any self-respecting party and to deliver that you need good speakers. Speaker quality (along with the playlist) has a big role

in deciding if your party is fun or not. So if you want people to remember your party and talk about it for ages, buy the speakers from our *Recommended Buy* section. When all the things are finally got, just turn up the speaker and let the bass drop. BOOM!



Philips Hue

Setting the mood for your party is very important and for that the most crucial part is having amazing lighting. But buying fancy disco lights is nothing but stupidity, so why not go for lights

which give you the best of both worlds? Think about switching to Philips Hue which works as normal lights on regular evenings and can easily switch to disco lights mode for your party. Sweet eh?

Slow the shutter on your DSLR camera

Who doesn't like to get their wasted photos taken at a party? The only disappointment lies when there are no good pictures. Never again. Here are some tricks to get the most out of your DSLR. Slow the shutter on your camera so it stays open for a few seconds. Take a flash photo and move the camera around. Any colourful lights in the room will smear across your frame, giving your images an energetic, funky look. Give it a try!

Decide who and what

When it comes to deciding the theme of your party, what (soft) drinks should be served, what food needs to be there, and other sundry items, can be a royal pain. Also, the most common problem is keeping track of who's coming to the party and who isn't. We present a solution to both these problems. Enter Slack. This collaborative app can help you make sub-groups inside a master group. It also allows you to invite people to chat about anything related to the party. For keeping track of the guest list, try rsvpify, the perfect way to send party invitations and keep track of them.

Rsvpify: <https://rsvpify.com>

Slack: <https://slack.com>

Make robots your servants

Robots can give your party the perfect tech-infused hipster look, making it unique and amazing. You can choose from various domestic robots available in the market like Party Bot, WowWee MiP Robot or iRobot. These robots can act as basic butlers for serving food, help you with entertainment and even help clean up after. So buy one and make it do all the work while you enjoy your party. Enjoy!

A tech-infused hipster party!

Corporate parties can be too formal. House parties can get dull. So why not make them amazing by bringing out the geek in you? These hacks can make your party unique, memorable and mesmerising. Time to plan your setup and get the geeky-party started!



LED crockery

We all know glasses are one of the primary centres of attraction in a party and we always look forward to buying fancy ones

to show off. Time to give LED Crockery a chance and make your party unique! Buy LED Light Up shot glasses and make your drinks glow in the dark. You can also consider HTML shot glasses for an alternative if LED is not your thing. Refer to the links below.

Link 1: <http://dgit.in/ShotLED>

Link 2: <http://dgit.in/ShotHTML>

Get social

Add the cool quotient to your party by creating a hype about your party in the digital space. Make your own Community Geofilters on Snapchat and let your followers know how you party. To make your own Snapchat Geofilters refer to the link [<http://dgit.in/Snapchatgeo>]. This can come up as an amazing tool to flaunt your crazy tech-infused hipster party.



Be the DJ

A party isn't anything without music, and carrying heavy equipment musical setups can be a pain. But thanks to applications like Edjing which

Origins

Keyboards to touchscreens, mouse to gesture input, we trace the transformation of input devices

**Logitech acquire Jaybird**

Logitech buys Jaybird for 50 million which is a sports headphone and wearables firm.
<http://digit.in/Jaybrd>

PLAY - SCHOOL

Some of the most unique education startups in the country are changing the way children feel about studies

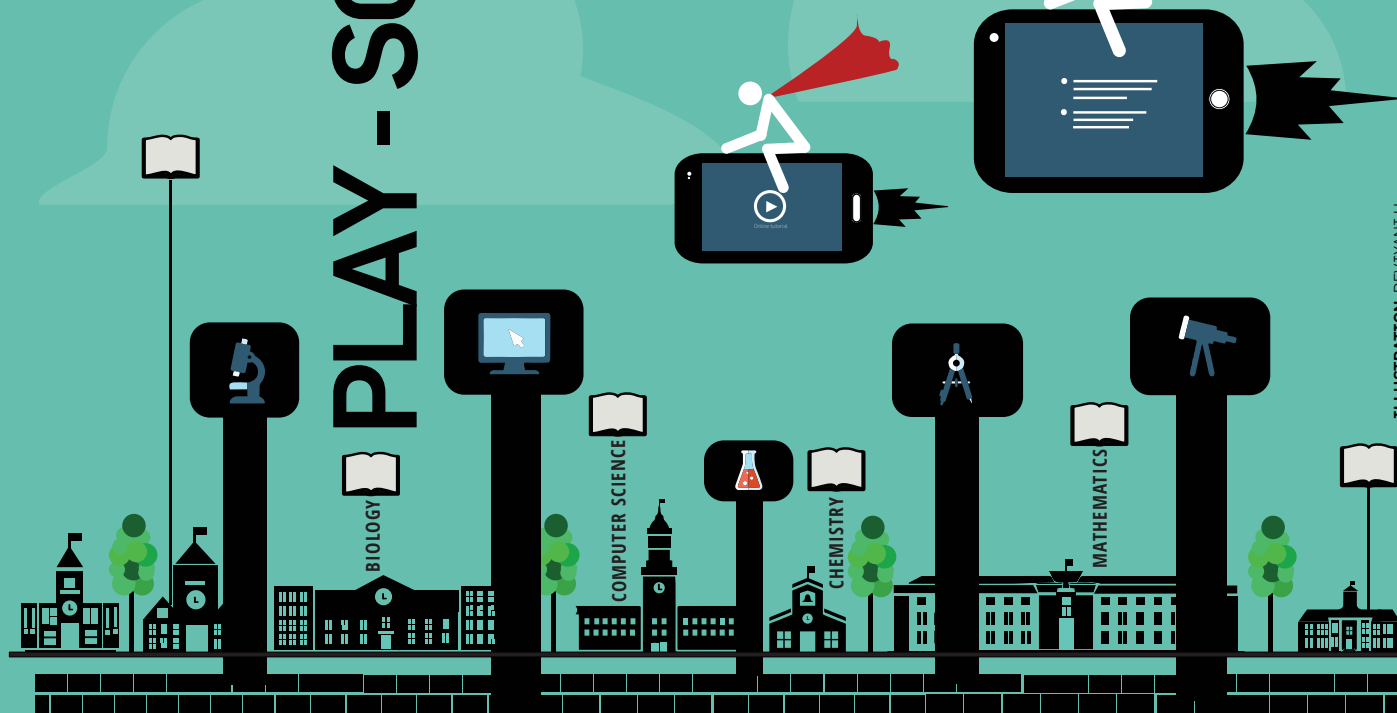


ILLUSTRATION: DEVYANI H

Arnab Mukherjee
arnab@digit.in

Study! This one word is often enough to send a kid into a bad mood, or remind a lot of us of some not-so-fond memories from school or college. Although it is an obvious fact that education and its growth are directly linked to the growth and opportunities in a nation, the quality and method of education in our schools and colleges often leaves students wanting more or dreading the whole experience altogether as a chore or a tiresome effort.

A host of startups in India are trying to tackle these very problems in the education sector by leveraging technology to make education more accessible and approachable on one hand, and on the

other bringing world class experts and state of the art knowledge to help learners achieve what would take a lot more effort otherwise. Don't worry, we know that the exam season is just over and many of you just got started on enjoying your vacations. Consider this one a repository of resources on how to make studying all the more easier this coming year and later in the future, without losing your shot at any of the goals that you have set for yourself.

From your day-to-day classes to the lofty entrance exams, these startups want to provide you with all the resources you may need to give it your best.

Vedantu

Started by former IITians, Vedantu is an online tutoring platform that provides live tutoring for students from classes 4 to 12

for both ICSE and CBSE boards across India. It has a wide array of available subjects at a number of levels ranging from Science (Physics, Chemistry, Biology), Mathematics to Hindi, German, Aptitude and more. This format of 1-to-1 or 1-to-few tutoring is similar to what students have been used to otherwise, with tuition classes being a norm in the Indian education system. Vedantu takes that familiarity one step further by providing audio-visual techniques via WAVE (Whiteboard Audio Video Environment), a technology they have developed inhouse, to further aid the teaching process.

On one hand there are specific exam revision courses available for multiple boards from specific teachers, with fixed pricing and fixed schedule. On another format, particular teachers can be sought



Pressure-sensitive screens

Android N now supports pressure sensitive screen which will promote phone companies to develop their own version of 3D Touch. <http://dgit.in/3DAndroid>

Geek life

via a search feature that allows you to see their profile, qualifications, previous ratings, total hours taught and how much they charge on an hourly basis. You can also contact them before enrolling them.

The Instalearn feature allows you to ask doubts instantly to any teacher available online. If the subject and grade that you have selected does not have teachers online, your doubt will be resolved at a later time. There is a free trial also available for new sign ups which adds certain balance into your Vedantu account, allowing you to try out a session with a teacher of your choice.

Although the approach is the strength, it might also be a weakness in cases where

- Behavior Variation - Low Stamina, Performance variation based on time of the day
- Academic Weakness - Actual knowledge of concepts

Each exam you give on the platform is followed by detailed analytical results about the above factors based on your performance in the test. You can also bookmark questions during the tests you take in the "Practice" or "Test" section to access them in the "Revision" section later.

The "Learn" section provides you detailed info from various sections of the website regarding particular chapters and concepts - like Questions that rankers got wrong, important theories, previous year questions from that topic, relevant exams etc.

The "Ask" section allows you to post your doubts and queries to be answered by others while the "News" section takes you to 100 Marks by Embibe, a news portal to stay on top of the most important news regarding the exam that you seek to target.

You can also use the Rank

and College predictor on your profile, although we cannot assure you that it will be correct.

The platform works on the Freemium model with "embiums" being the platform currency that you can purchase for real world money. This particular choice is a bit confusing as it would be helpful to directly see the actual expenditure needed. A varying degree of things like a complete test series, a special series on careless mistakes etc are behind a paywall. Overall, Embibe comes highly recommended and is definitely worth a try.

Meritnation

Currently backed by Info Edge, Meritnation dove into the K-12 education scene way back in 2009. This platform works out as a complete overall social network experience for education. Signing up on this platform involves providing your Board, Class, School and some other minor details. It automatically links you to other students from that school and suggests them as friends on the network.



Vedantu's model is one of the most unique ones out there

even their proprietary low data solutions might not work out on low speed connections. Also, there are competitors who are specializing in exam preparation via test series and paper based approach, which might be preferred by a significant share of students.

Embibe

One name comes across a lot if you look around online for a test-preparation site for the standard Indian entrance examinations for Engineering as well as Medical graduation, along with the K-12 segment of studies. Embibe provides a very good interface that is both mobile as well as tablet friendly. Founded by an Aditi Avasthi, Embibe's aim in this segment is to leverage data analytics to help the student tackle the pressure of exam preparation.

Once you are signed in, you can experience Embibe's attention to 3 functional areas to improve performance -

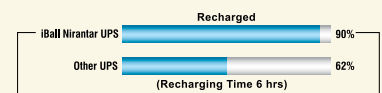
- Exam Techniques - Wasted attempts and Unproductive time spent on them, Careless mistakes



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Apple supporting Museum

Apple is auctioning an unique iPad Pro, Smart Cover and Pencil to raise money for London's Design Museum. <http://dgit.in/Applemuseum>



Huawei VR Headset

Huawei unveiled a VR headset that works with the P9, their flagship phone. <http://dgit.in/HuaweiVR>

NAYI DISHA

Bangalore based Nayi Disha Studios is a game development startup that takes the boredom out of pre-school education and throws it out of the window. They develop motion-sensing interactive games that aim to make learning a lot more fun by making the kids run, jump, move their hands and a lot more as a group to interact with the game onscreen. It takes into account the different ways a child can learn via listening, watching and moving. Here's how they do it - <http://dgit.in/NayiDisha>

All the Live classes for Entrance exams, Chapter tests and most Online tuitions on the platform are paid, with study materials and textbook solutions available for free. It also has IITJEE and AIPMT preparation material. For most of these, the first chapter or test for any subject is free with the rest of it being paid.

Students can exchange their views in the Ask & Answer section, regarding Academics and School Talk, although the School Talk section doesn't seem to have a content monitor, and not all content being posted there is relevant to studies.

Apart from studies, the personal profile section has Aptitude tests, Personality tests, Career Guidance, Stream Selection help etc. One of the biggest problems with Meritnation is that there is too much for a student to deal with. The home page itself consists of a mix of Questions, Doubts posted by others, Videos seen by others, and other activity by people on your network, which might end up being more of a distraction than helpful. But if someone can deal with this quantity of information not just about themselves but their

fellow students as well, then there is truly no other alternative to Meritnation.

BYJU

Out of all the apps that we tried, this was the only one that blocked screenshots. That should tell you something about the amount of work that has gone into creating the content at Byju's classes - which is its biggest strength. Started by Byju Raveendran, Byju's is totally aimed at creating world class content related to each topic in such a manner that the explanations almost seem intractable. Once you sign up, you will soon be assigned an instructor who will get in touch with you to guide you through the learning process.

According to them, their teaching techniques are copyrighted, with the teachers being alumni of some of the most prestigious institutions in the country. Along with that, they have a dedicated content production team that is dedicated to making the videos academically and creatively best in the market. There are also chapterwise and unit-wise tests that are adaptive in nature, that is, the difficulty of the next question is determined on how you perform on the current question.

BYJU's has been consistently acclaimed for the quality of their course and video material and it is definitely worth a try.

TOPScorer by eSense

Although TOPScorer's content leaves a lot of scope for improvement, it has one very unique feature compared to other startups - an offline product. Along with their online product on their website which includes textbook chapters, audio visual aids, chapterwise and cumulative tests, report cards etc, there is an offline offering that brings all of that beyond the website as a pendrive for Windows and an SD card for android. The only

feature you miss out on is the feedback regarding errors on the product.

Created by the Navneet group, that has had a long relation to the education sector in India, TOPScorer shows the advantage of all that experience in their close integration with the school curriculums at national and state levels. Due to the large adoption already underway, there is a facility to analyze and compare your scores with a large number of students at a state level. There is also the feature of 'Build my pack' that allows you to select only the chapters and tests you want to and pay only for those.



BYJU'S is easily the winner in content quality




One of the only startups with an offline solution available



As you can see, Meritnation is highly cluttered

There is also a feedback tool that lets you take screenshots of any difficulty or error you face in the course of your learning and report it to the support team.

To check these features before you buy a pack, you will need to sign up on the website. And if you are on the app, some course videos may not work.

The offline product can be purchased from TOPScorer.com, teenvan.com, esense.com and offline via sales team and telemarketing. Their price varies from ₹2,500 to ₹10,000. They also provide a solution for schools called TOPClass - almost 10,000 teachers are already using it to teach more than 7 lakh students. 

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Tesla Model S upgrade

Tesla Model S being one of the highest-rated electric cars ever gets an upgrade <http://digit.in/teslas2>



HTC 10 leaks

HTC's upcoming flagship phone leaked which was announced on 12th April, the promo video involves an early sneak peak. <http://digit.in/htc10leak>

INPUT DEVICES

From punch-cards to virtual hands, Input devices have come a long way. Let us find out how.



The original source of inspiration for the QWERTY layout keyboards

Arnab Mukherjee

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When asked to picture a computer, here is possibly nobody who will do so without including the ubiquitous keyboard and mouse. In fact, many of us would probably recall the peripheral first and the rodent later, upon hearing the word “mouse” - a quick google search will reveal how true this is. But computers weren't invented with input devices in mind, atleast not the ones we use now. With the ease of gliding our hands on our touchscreens or directly talking to our devices, it is very easy to forget the evolution of input devices in the

last century since computing devices were introduced. From punchcards to motion detection, let us see how we arrived here.

Just the right buttons

Key punches were around since as early as the 1800s in the form of Jacquard loom cards. Although there were other earlier ways to input information into a computing device like switches and dials, the keypunch and the punch-card methods were the first to have widespread usage for entering, storing and retrieving data. Around 1890, Herman Hollerith developed the first key punch device to tabulate the results of the 1890 Census in the USA. Since the census had 80 Questions, the key punch cards had 80 columns - a

number that carried his legacy in the form of 80 column computer screens for decades as well as the company he created, which later became part of IBM.

A step further, multiple punches could represent letters and numbers, which were also written on top of each column so that the cards could be read normally by eye. Re-programming or re-typing involved removing and rearranging cards or sometimes inserting entirely new ones into the sequence.

Derived mainly from the teleprinters and key punches of the yesteryears, keyboards made inputting information a very simple task of re-keying the statement compared to the complete removal and reinsertion of cards in the punchcard system. The initial design was inherited from typewriters as the QWERTY layout, which was never really changed although alternatives, like Dvorak layout, claim better speed and lower fatigue. In fact, there are a number of features about the current layout that are obvious shortcomings, like the single handed typing of many common words (was, were), left handed dominance, letters frequently used together not placed close etc. In spite of all these, the alternatives didn't really catch on.

Actually, there are vestiges of the keyboard's usage as a pre-mouse era input device that are still evident on most present day keyboards. Case in point - the scroll lock; Have you seen anyone actually using their keyboard to scroll anymore? Another example is the System Request (SysRq) key, from mainframe days.



Toyota's Wooden Concept Car

Toyota's Setsuna is the concept car to debut from a major automaker this year, this concept roadster is made entirely of wood. <http://dgit.in/Tsetsuna>



Cheap BB Android smartphone?

BlackBerry is planning two mid-range smartphones for the year 2016. One with a physical keyboard, and another with a full touchscreen. <http://dgit.in/CheapBB>

Origins

A widely accepted rodent

The technical innovation behind a computer mouse was already in place even 50 years ago. Douglas Engelbart and his lead engineer Bill English made their first working mouse prototype in the 1960s in



The Engelbart mouse

their lab at the Stanford Research Institute (SRI). They actually named it the mouse due to the cord extending out of the back portion of the device, which looked similar to a tail. This entire idea had evolved from earlier developments of a trackball, which

involved multiple rolling discs with a rolling ball. Whenever the ball was rolled, the movement of the connected discs created signals at contacts with wires in the device. Each contact conveyed a certain movement to the digital computer which used that to plot the position of the pointer on the display.

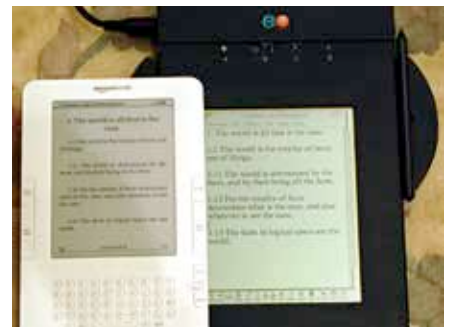
It was many years later that the mouse was used famously with the Xerox Alto at the Xerox Palo Alto Research Centre. In 1979, it was this very same PARC lab that was (now famously) toured by Steve Jobs, and is said to have been the source of inspiration for the mouse-driven interface that Apple eventually developed for the highly successful Macintosh computers released in the 1970s. (and as some would say, the Microsoft Windows interface as well)

Optical mice were made affordable by using a rubber tracking ball that worked in a way similar to the original trackball technology. Also, most mouse model designs have used either a two button or a three button interface, with the

exception of Apple that had stayed with a simplified one button interface through and through. Further developments saw the inclusion of a scroll dial, extra buttons and even gyroscopic capabilities in some models that detected hand waves.

A touching moment

Many of us would be surprised to know that the touch and tablet based interface was actually invented before the modern day mouse. In the 1950s and 60s, such



The Eo Personal Communicator next to the Amazon Kindle

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Jaguar launches InMotion

Jaguar Land Rover has launched a startup studio which will design mobility apps and services.
<http://dgit.in/JInmotion>



Kindle Oasis launched

Amazon's upcoming premium Kindle priorly leaked with a major change in the design.
<http://dgit.in/Amoasis>

devices were mostly used for the input of graphical data into computers, much like modern day digital pens. In fact, Apple had its own touch based tablet interface way back in the late 1970s. The Apple Graphics, which was designed by Summagraphics and also marketed as BitPad, was initially sold as an accessory with the Apple II Personal Computer. Actually, this device wasn't a standalone tablet in the likes of today's tablet PCs. Instead this was an interface for graphical input for the Apple II. The interesting fact is, this predated the Apple II's mouse by almost 6 years.

A fast forward to 1993 brings us to one of the most interesting devices on the touch front - The Eo Personal Communicator. It was a notebook sized fullscreen touch-screen device that ran PenPoint OS, one of the first operating systems to be designed targeted towards the use of styluses. Unfortunately, the company was shut down after it failed to meet revenue targets set by AT&T that had recently acquired it.

As the components became smaller and more powerful, the desire for smaller compact devices gave rise to the Personal Desktop Assistants, Or PDAs. As the touchscreens went smaller, the mode of input had to be redesigned as a full keyboard would no longer fit on the handheld PDAs. This requirement gave rise to new and innovative methods of input on these devices. One such method was used by Palm in its PalmPilot range of products back in 1997 and it was called Graffiti. Each device had a touch sensitive area to detect stylized characters drawn with the included stylus. There was also a tutorial game included which taught players how to draw stylized versions of characters falling on the screen.



The PalmPilot being used with the Graffiti gesture based input system

The feature phones arrive

PDAs were somewhat expensive for general usage and with components further reducing in size, there was an opportunity for feature phones to rise and become popular devices all around the world. This also gave rise to one of the most used forms of communication worldwide - texting. Since phones had to use physical buttons, it became a challenge to include an entire keyboard with full features at the size of the keypad. There were many suggested methods and the one that stuck was the one that is still seen on keypad phones. A single button press indicated the first letter for that key, two presses for the second letter and so on. As phone screens grew larger, this system grew



The BlackBerry Torch keyboard

more sophisticated with the inclusion of dictionaries on phones as well as the T9 system that began predicting words based on the letters being typed.

One of the unique innovations on this front was from BlackBerry. They included a full featured keyboard on the phone with buttons large enough to be used with the thumbs. This keyboard is still very popular with frequent texters and is often included as a slide-out under the original phone.

Touch 2.0

While we already know that touchscreens and touch screen devices weren't really invented quite recently, the innovation that would be the next big breakthrough was still in the making even a couple of decades ago. A pioneer gesture recognition tech company, FingerWorks, released a range of multi-touch products

VIRTUAL REALITY

We are quite aware of Virtual reality being the next big computing interface at present. With its completely different approach to interaction, it is evident that there are new methods of input. The HTC Vive uses controllers that can be detected by its lighthouse sensors and onboard cameras to mimic hands in the virtual reality. There are other alternatives that can directly sense your hands as well. A combination of these sensors along with modification in the platform could very well make the future input devices completely virtual as well.

in 1998 including the iGesturePad and TouchStream keyboard. This company was acquired by Apple in 2005.

Less than two years later, in 2007 Apple released the iPhone with the most innovative touchscreen technology anyone had ever seen, especially on a handheld device. The phone interface was completely touch based, with every part of the screen having a functionality on every interface in the OS, including the complete virtual keyboard

The widespread usage of the stylus changed when Apple implemented a multi-touch capacitive touchscreen on the iPhone, which was highly sensitive and could detect several contacts at once to allow gestures like "pinch" and "zoom" in the OS. The entire OS was designed to take advantage of this touchscreen with completely new ways to use standard applications like the calculator, camera, games etc. Before we realised, gestures like swipe to scroll, inertial scrolling, long-press, press

and drag became commonplace implementations on any and every touchscreen device and mechanisms like pattern locks, tap to focus in camera, gesture based commands became commonplace. Apple changed the phone standards overnight and stylus based touchscreens almost immediately became obsolete. This widespread adoption is still evident in the regularly ongoing copyright infringement lawsuits between



The iPhone, First generation



Molotov

Molotov is a french startup giving Apple's rumoured TV service a hard time.

<http://dgit.in/Molotovx>



PCs open to ransomware attacks

Using old versions of Follett library management software, criminals have found some particularly insidious ways to spread ransomware. <http://dgit.in/Rsmware>

Origins

Apple, Android mobile manufacturers and Windows mobile vendors, all fighting over the same market.

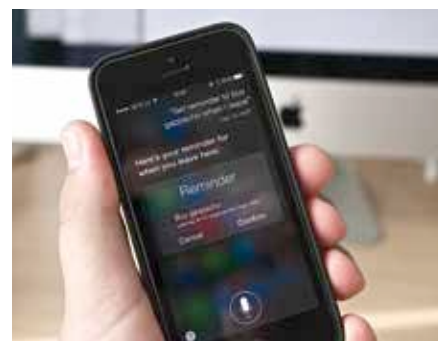
The Interfaces of the Future

Many of us remember the announcement of Microsoft Surface, the tabletop gesture based computing interface that completely felt like science fiction at that point of time. Currently, it is used widely by major corporations for several uses. It is not a surprise to see other devices and manufacturers also bringing such touchscreens and tablets to be used on tabletops and public installations, like the entertainment screens on flights, or the ticket kiosks at stations. Voice based Input almost plateaued in the 90s at about 80% accuracy. The recognition systems could only work well with a limited universe of languages, that too with most of the results being statistical guesses. Windows Vista and Mac OS X included built in voice recognition capabilities. This feature needed to be set up with a separate microphone peripheral and did

not have the ease of use of the keyboard and the mouse yet.

Innovation in speech recognition and voice commands came back into the forefront with Google's Voice Search App for the iPhone. This development was highly significant for two main reasons - the first one being the incentive present to provide alternative methods of input for phones, with the screen size being a limitation to include full scale keyboards, and other one was that Google offloaded the actual computational part of the recognition process onto its cloud infrastructure, harnessing that massive computing power to analyse the details of the huge variety of human languages available out there. To this computational power, Google added the data available from its billions of searches to predict what you're probably saying.

Gradually, Google added voice recognition to the entire Android ecosystem and currently Google English voice search includes almost 230 billion words. Alongside that, Siri has definitely made



Siri, best friend to many iPhone users

a mark in speech recognition by adding personality into the responses. It takes what it knows about you to give contextual replies that are even funny from time to time. This level of speech recognition is not just limited to phones anymore, as many devices, including home automation hubs are now including speech recognition and even basing their entire design on that feature at times. Pretty soon, you will be talking to your coffee maker and asking your speakers to keep it low. **[1]**



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YOUR APPS INSIDE A MEIZU SMARTPHONE!

Digit organised a student developer event in Delhi on Saturday, April 16th, which was powered by Meizu to promote developer initiative and create great apps that can be used in the Meizu ecosystem to better augment the Flyme OS.

The Top 15 developers from all over Delhi NCR were selected and invited to be a part of the event which was held in Sri Aurobindo Centre for Arts & Communication in New Delhi. The event started with a video of Meizu's dynamic and unique manufacturing process, and how every detail on the phones are crafted by state of the art machines.

THE TOP 15 DEVELOPERS FROM ALL OVER DELHI NCR PARTICIPATED IN THE MEIZU EVENT

Mr. Jackie Chan, the marketing Head of Meizu India then gave the keynote speech in which he briefed the audience with the history and latest developments at Meizu. This was then followed by all the developers presenting their Apps detailing all the features and USP's and answering the jury's and fellow developers' questions. Lunch followed right after, which was followed by a group interaction session with the Meizu team. The event ended with a prize distribution ceremony to laud the efforts of all the developers and Meizu presented all the developers with a Meizu m2 smartphone.



About 15 participants were selected to present their App demos



The audience listening to a participant



The Jury sharing their insights and feedback with the participants



Participants with the Meizu team



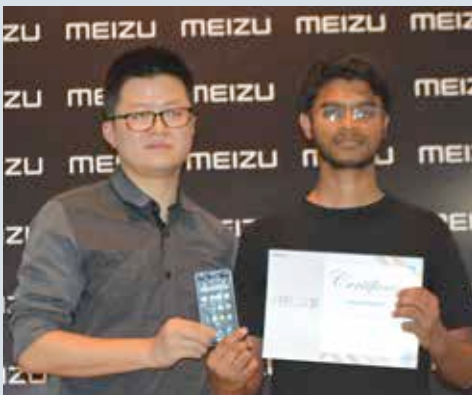
One of the participants giving a Demo of their App via voice recognition



One of the participant explaining their app during their presentation



Participants being presented with the Meizu m2 smartphones and Round 2 certificates



Participants being presented with the Meizu m2 smartphones and Round 2 certificates

OUR TOP 5 APP PICKS

CODE WITHOUT A LAPTOP

I am thinking of developing an app with which users can code anywhere on their mobile device. Apart from this, the app is going to have some challenges and coding problems, user will have fun to solve those. The supportive languages would be JAVA, C, C#, Python and maybe some more! This solves the issues of students or young professionals who don't have a laptop to code, but still want to. I have done some research and will be able to build the product as I've started working on features like Syntax highlight, suggestion bar and other complex time consuming tasks for the app.

—ANKUSH CHUGH

HELPING HANDS

Across the world, there are people in excess who throw their stuff because of the new trend and obsolescence of the old goods. But they have no idea that there are abundance of people who have never even heard of that goods. People also don't know that where to donate that unused goods. For this problem an app can be developed which will connect orphanages/ shelter homes/ organisations etc. directly with the donors. People can provide clothes, toys, gadgets, money etc. according to the need with the help of app. Food scarcity is also a major problem so restaurants/food chains/Parties unused food can also be delivered to the slum, orphanages so that the needy can have better meal and we can be a helping hand for others.

—AKANSHA MARWAH

BUSINESS CARD SHARING APP

In business meetings and startup weekend meetups, we have to carry our business cards to network effectively. Carrying cards is a pain, but with this app we can share our business cards virtually by entering essential information like email address and phone number without a hitch.

—DIPESH NAGPAL

ANONYMOUS

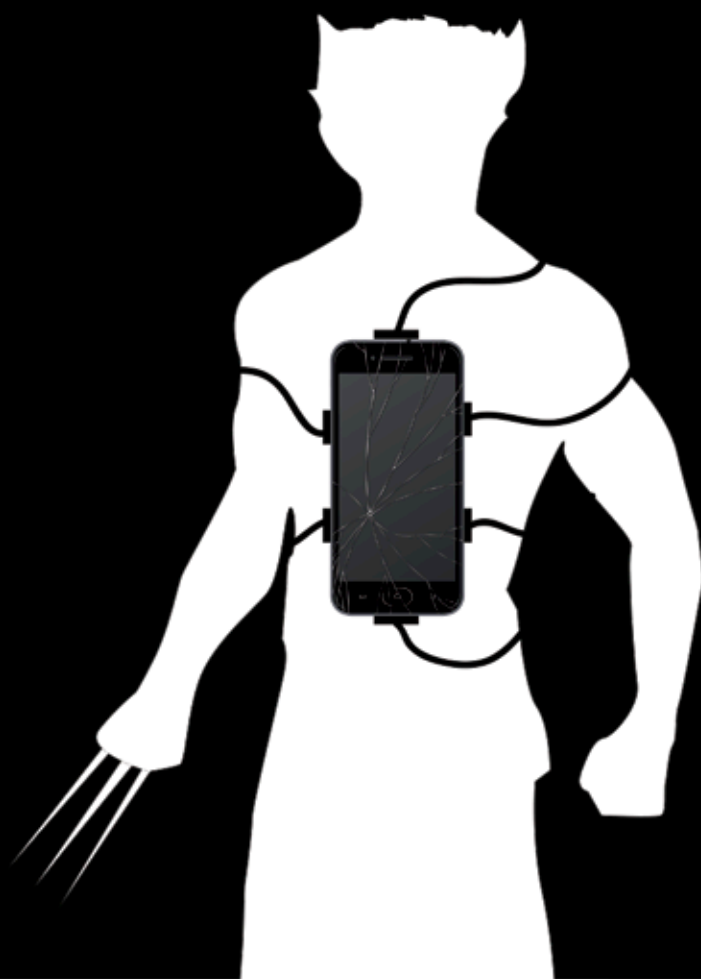
An app which lets you make an anonymous announcement hyperlocally.

—ASHUTOSH GOEL

ACCIDENT ALERT

My app will send an emergency beacon signal to prefixed numbers on your phone (friends and family, and police and hospital services) based on your location, average speed using GPS history, and accelerometer and gyroscope sensors.

—VISHAL JANGID



SELF REPAIRING MATERIALS

WOULD YOU LIKE IT IF YOUR GADGETS COULD HEAL JUST LIKE THE WOLVERINE?

ILLUSTRATION: DEVYANI

Arnab Mukherjee
arnab@digit.in

When a smartphone or a laptop is dropped from someone's hands, one of the universally felt emotions is that of severe anguish. Several questions immediately pop into the head - did the screen break? Is it working? How much is this going to cost? Will my new phone have scratches and dents now? In fact, Motorola based an entire smartphone's design to tackle this in the Moto X Force by implementing a shatter proof screen. But is sheer brute strength all that can be done to make gadgets, or at least parts of gadgets, damage proof?

Self repairing technology is not an entirely new scientific breakthrough right now. Actually, if you have been delving around smartphones and following tech-

nology updates for more than a year or two now, this cannot be the first time you are hearing about self repairing tech. But it is about time that this breakthrough escapes the labs and enters mainstream store shelves. Let us explore what it is all about and how close we are to damage proof gadgets that can at least give themselves first aid after an accident.

What does it actually mean?

Before we begin, let us clarify that self repairing tech does not imply T-1000 level healing, where your broken dis-



Definitely not a good day!

membered gadgets gather themselves together and somehow become one again. Nor does it cover intelligent robots that can put themselves together. What self repairing tech in its current state of the art does is mostly surface repair, which highly depends on what material the gadget's surface is made out of.

Any material stops working the way it is supposed to due to three factors -

- Decay - Over time, factors like light, heat, micro organisms, cause certain material to outlive their usability sooner than they would unaffected.
- Fatigue - Physical usage factors like friction and wear-tear
- Defects - Under suddenly applied force and stress, some materials show cracks and fractures, or holes that spread very rapidly.

The first two factors are actually unavoidable for most material and can



iTunes kids allowance shutting

Apple is shutting kids allowance for iTunes from May 25th and has already stopped taking new users.
<http://dgit.in/itunesallow>



FB unveiled bot for Messenger

Facebook has unveiled its messenger chat bot after Microsoft announced its bot for skype.
<http://dgit.in/FBvsMI>

Tomorrow's tech

be comparatively easier to spot. It is the third one that is the most dangerous and can even form internally. Although there are techniques to test for these without destroying the material, like ultrasound scanning, most of these defects happen during actual usage where such testing is not being done.

This is where the inspiration from our very own human body comes into play. The human body can actively sense damage, stop it from worsening and start working on fixing it in real time. It is this phenomenon that self-healing materials aim to replicate, without human intervention in the repair process.

How does it work?

Almost all the things that we see around us nowadays are made out of plastics, or as science likes to call it, polymers - smartphones, shoes, bottles, footballs, houses etc. So it is not unexpected that research into self-repairing materials is mainly focused on polymers. This research has been mainly ongoing since early 2000s and one of the first breakthroughs was achieved by the team of Scott White, Nancy Sottos, and their colleagues from the University of Illinois at Urbana Champaign.

Embedded Healing Agents

The most approachable self-healing technology involves micro-capsules of adhesive substance embedded into materials. When the material cracks or is under stress, these capsules break open and the adhesive material, or glue, comes out to fill the cracks and solidify. This glue can be simply a strong adhesive that holds the material together. In another approach, where the material itself is mainly a solid polymer, this glue-like material is a liquid made of the corresponding monomer (the basic constituent of the polymer). Now, when the material cracks, the capsules break open, and the polymer is exposed to the monomer resulting in further polymerization that creates more of the original polymer which fills the damaged area. Typically, this process might need a powdered chemical catalyst to be included for it to successfully occur at normal temperature and conditions without intervention.

The main problem with this approach is that the embedding might structurally weaken the original material. Due to that reason, there is a size restriction on the capsules. Also, this is a one-time method, because once the capsules are cracked, another instance of damage at the same location will have nothing to rely on. And that second instance is highly likely due to the weakening of the material after repair.

Also, since microcapsules have to be below a certain size threshold, there is a very strict limit to the size of cracks that can be filled.

Microvascular Healing

Taking the human body analogy one step further, microvascular healing technology implements micro-tube like structures within the material that connect to a pressurised source of adhesive material. Wherever a crack occurs in the material, the tube is depressurized at that end and the material flows into the crack. This method can seal cracks up to ten times the size that can be fixed by micro-capsules.

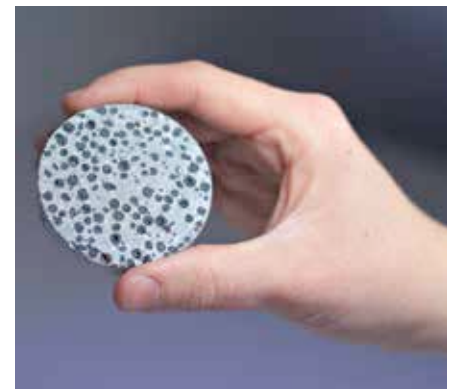
This method has its own drawbacks as well, since some cracks will spread faster than they can be repaired. But on long term cracks, like those that appear on pavements and buildings, this method is certainly useful.

Memory Materials

There is a particular classification of materials that has a tendency to remember and retain its original shape. Don't worry, there is no actual memory involved here and your favorite shoe is not suddenly

going to become sentient. Memory materials are all around us, like the frames of the eyeglasses that we wear, which snap back to their original shape even if we bend them.

Some of these materials require an external influence like heat or light to repair themselves. This can be achieved by a network of fibre-optic cables similar to the microvascular network described in the previous method. But this network



Self Repairable concrete can extend the durability of construction significantly!

would bring heat and light to the point of damage, causing the material to alter back to its original configuration. In fact, it has the added advantage of making the material fibre-reinforced.

So what's really out there already?

Although it is true that full scale self repair technology is not even present in the labs as of now, there have been a lot of interesting developments in that direction that show a lot of promise.

When Hendrik Jonkers, Microbiologist at Delft University, was looking for a way to strengthen concrete, he didn't turn towards the conventional methods of steel or stone reinforcement. Rather, he took inspiration from his own domain of biology. His solution involves using limestone-producing bacteria in the mixture for concrete, which can close up the gaps eventually. While the concrete is being mixed, specially selected types of bacteria along with nitrogen, phosphorus and calcium lactate are added as ingredients. These constituents can stay dormant in the concrete for upto 200 years. When-

SOMETIMES, ALL THAT YOU NEED IS A LITTLE HEAT

Thermosetting polymers break down into their original monomers if they are heated. When allowed to cool, these monomers join back into the polymer. Although this heat might seem like a broad assumption, in some situations it is readily available. Imagine an Armored Vehicle with the glasses made with such a material. The impact of a bullet would generate enough heat for the material to heal itself.



60 Sec video in Instagram

Now Instagram increased its video limit from 15 sec to a minute.

<http://dgit.in/insta60sec>



Moon radiated

Scientists find radioactive iron isotope on the moon. -found exclusively in Supernovas- <http://dgit.in/sprnvablst>

ever a crack shows up on the surface, the bacteria is activated by air and it starts reacting with the calcium lactate and oxygen to produce insoluble limestone that fills up the cracks. This method can deal with cracks up to almost a centimetre in width.

In 2013, LG had announced LG Flex which, apart from being one of the few phones in the market with a curved display, was also the only one with a back that could heal itself from minor scratches. This was no marketing gimmick as tech enthusiast Marques Brownlee demonstrated the back of the phone healing from scratches made with keys. Although there have been several speculations and guesses regarding this technology, LG has so far refused to reveal how it works. The most accurate guess seems to be related to Hydrogen bonds and their affinity to stay together. It should be noted that this will not work if the scratch is deep enough to remove the material itself. Also, Apple has indicated



Uncountable lives can be saved if aeroplanes could have self-repair wings

that they are currently working on self healing technology to make iPhones that can repair themselves. So, while it is true that self-repair technology for smartphone screens and bodies are already possible, they are still too expensive or impractical for mass production.

In development since 2012, it was only last year when Professor Duncan Wass

and his team announced the development of material for aircraft wings that can repair itself after suffering damage. This works on the microsphere embedding principle and also involves a catalyst that speeds up the chemical reaction involved. It was found that the material was as strong after the reaction as it was before the damage. Professor Wass' team has been focussing on developing carbon-fibre material with this technology as it has massive applications in the fields of automobile, aviation, sports equipments and a lot more. For example, offshore wind turbines, that often get damaged due to bird strikes, could self repair and not require extensive maintenance any longer.

The Future

It is no breaking news that we need to rapidly shift over to sustainable methods of manufacture and consumption to ensure that we even have a future worth living in. On that note, the importance of self repairing tech is obvious. If less concrete needs to be produced due to a kind that repairs itself, there will be fewer factories manufacturing concrete in polluting and unsustainable ways. If fewer smartphones need to be replaced every year, fewer factories in third world countries will ignore basic human rights and living conditions to produce cheaper smartphones by the millions to satisfy the current demand. This technology truly holds the key to a sustainable world that spends less on replacing and fixing itself, produces a lower carbon footprint and thus lets itself exist way longer into the future. 

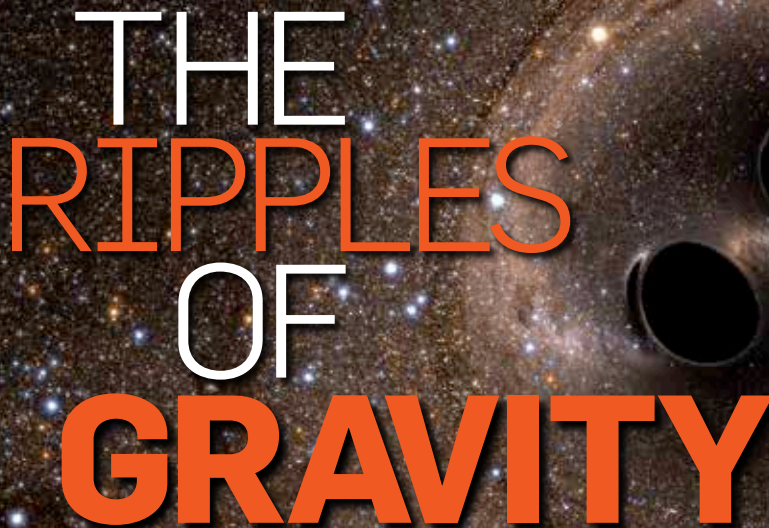


LG Flex, the curved phone with a self repair back. Talk about being unique!



CloudReady now allows you to dual boot Chromium and Windows.
<http://dgit.in/ChromeDB>

Space Age



THE RIPPLES OF GRAVITY

The discovery of gravitational waves is of immeasurable significance to our better understanding of the universe and beyond

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[illegible]

it has taken humanity this long to finally construct an experiment intricate enough to capture the data necessary to validate Einstein's predictions. So, one would expect that this would be an extremely complicated experiment that would take a couple of PhD's and a superhuman IQ to even begin to understand. But, at the fundamental level, this is an experiment that can be replicated at home! In this article, we demystify the physics that goes behind detecting gravitational waves and the seminal work that goes behind it.

To understand why gravitational waves are important, one needs to go back in time to when Einstein first proposed his two theories of relativity. The Special Theory of Relativity, first explained in the paper 'On the electrodynamics of moving bodies', published in the year 1905, answers some pretty important questions on space and time. Until then, the only person who had ever touched on such notions was Newton,

who merely proclaimed that space is space and time is time. 'Tis what it is' he said, before going down to the 17th century tavern at the end of his road and drowning questions of existentialism in considerable quantities of ale. Eventually, Einstein revisited these fundamental questions and answered them with two simple ideas. Time and space are equal, and not distinct, they form the fabric of spacetime, the arena where physics occurs and each observer has his own set of coordinates (a set of rulers and a clock) and therefore he/she measures everything independently. Except for the speed of light, which he theorised is a constant for all observers. Using this as basis, he launched into the general theory of relativity. This is what provided a basis to understanding gravitational waves, so let's consider this in some detail.

Let's take Einstein's theory of special relativity to be true (as opposed to sitting and reading through a decade's worth of



SpaceX-Rocket Launch

SpaceX shared a series of pictures which show their successful attempt to land one of its Falcon 9 rockets. <http://dgit.in/SpaceX-F9>



Saturn's Dust

Some of the Saturn's dust is beyond this solar system, NASA spacecraft tracked a different origin of the dust. <http://dgit.in/SaturnDust>

mathematical ideologies). Space and time are now an interwoven fabric, think of it as a giant membrane that exists everywhere (and every...when?) around us. So far, we have no objects or any physics at all! It's just one giant, happy, undisturbed membrane. For the sake of simplicity, picture a 2 dimensional membrane, which corresponds to one space dimension and one time dimension. Now, drop a tennis ball onto this membrane in your head. The membrane, which was stretched out now sinks under the weight of the ball. According to Einstein's theory of relativity, this is precisely what happens to spacetime in the presence of mass! The presence of any object warps space and time.

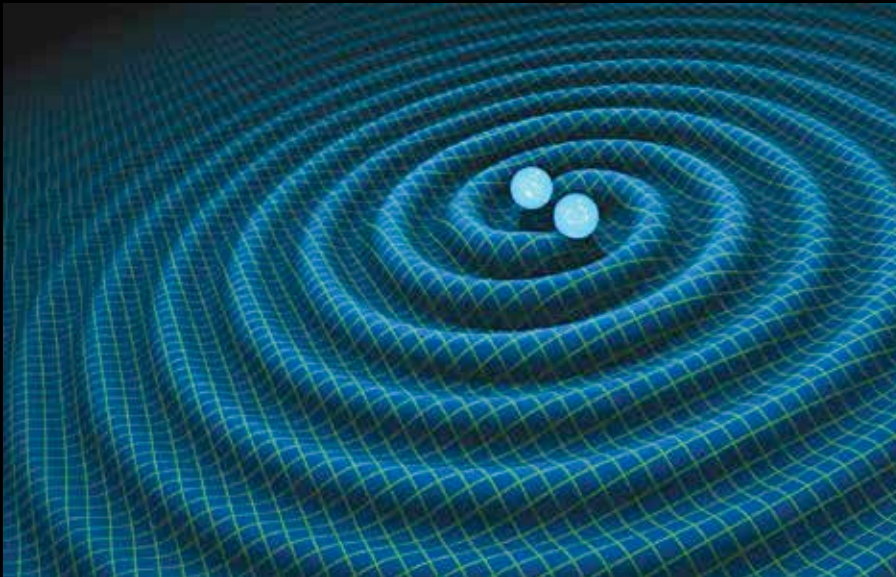
mechanism that is explained above is why planets continue to revolve around the sun, it's all due to the warp in spacetime that the sun produces.

This is a very handy idea. To understand gravity, we simply consider the warps produced by massive objects. This is why physicists are obsessed with geometry, everything we need to know about the masses and the dynamics of the body can now be understood, at a fundamental level, simply by the curvature the object produces. It stands to wit that this curvature produced by a single object will move with the object. This was the idea that prompted Einstein to predict the existence of gravitational waves. An object that is

el method of studying astronomical objects that are at a great distance from us simply by considering the gravitational waves they produce. The experimental setup took a mammoth 8 years to construct, and was completed in the year 2002. There are two facilities which together comprise the LIGO experiment: The LIGO Livingstone observatory in Livingston, Louisiana and the DOE Hanford site in Richland, Washington. Each observatory has an L shaped ultra-vacuum system measuring nearly 4 kilometres in length, where the experiments are carried out.

These detectors, despite the enormous complexity involved in construction and effective noise filtration, have a very simple principle at their very core: the interference of light. It works by having two long mirrors placed perpendicular to each other, a fair distance apart. The mirrors are freely suspended and are therefore allowed to move. A laser light, after it has been optically filtered to produce exactly one particular frequency is split into two beams and each beam is reflected off one mirror (the actual experiment uses a device called a Fabry-Perot cavity to make it reflect back and forth multiple times, but that is merely to improve the quality of the signal) and recombined with the other beam. Now, if the path that the light travels is the same for both beams, then the two light beams will have traversed an equal number of wavelengths and will therefore interfere constructively, i.e., every crest of one beam will correspond to a crest of the other beam and similarly for every trough. However, if a gravitational wave were to pass through the experimental facility, we would expect one of the two perpendicular paths to shift its total length. Therefore the two waves will no longer constructively interfere. By measuring how they interfere, scientists can then calculate how much the path length changed and for how long; correspondingly they can calculate the strength of the wave and how long the signal lasted for.

The problem with detecting gravitational waves is that these fields are weak. Very weak. So weak in fact, that even random signals generated by the sound of airplanes soaring many thousands of meters overhead are enough to disturb



Ripples or waves in the interwoven fabric of space and time

So how does this explain gravity? Go back to the membrane you have in your head, and place a coin somewhere close to the ball. The coin will automatically start rolling down to the centre because of the dent produced by the ball and, if you give the coin the right amount of momentum in the right direction, the coin will start spinning around the tennis ball. This can also be verified at home using a simple bowl: any coin with the right amount of velocity will start spinning around the centre of the bowl. Of course, eventually the real world experiment will fall to the centre because friction causes the velocity of the coin to slow down, but this sort of nuisance doesn't bother cosmic objects. The exact

moving will produce a moving gravitational field; a series of ripples as the curvature produced by the body moves with it, like waves produced when moving your hand through a pond of water. Since these ripples are curvatures in spacetime, we should be able to observe it as a 'springy' effect, a continuous contraction and expansion effect as the ripples move past us. An experimental detection of gravitational waves will, once and for all, conclusively prove Einstein's theory of gravity.

This is precisely why the Laser Interferometer Gravitational Wave Observatory (LIGO) was set up in the United States of America. The experimental data not only validates relativity but also provides a nov-



Kepler Telescope Recovered

NASA has recovered Kepler Space Telescope which slipped into 'emergency mode' when it was out for planet-hunt. <http://dgit.in/KSTnasa>



Solar Impulse 2

Solar Power Airplane- Solar Impulse 2 is on it's round the world tour. <http://dgit.in/Slrmp>

Space Age



One of the LIGO facilities where the experiments were conducted


the experiment. This explains why there are two locations for the experiments; by effectively identifying only the signals that are common to both locations, the experimentalists can filter out the signals produced due to noise at each individual location. That being said, we still require extremely large masses to produce fields of measurable strengths. It took a system as monumentally huge as two revolving black holes, some of the densest and most massive substances in the galaxy, to produce detectable waves. The announcement was made on 11th of February, 2016, and the signals that were observed matched the predictions of general relativity and perfectly complied with the relativistic description of the inward spiral and merger of two black holes. Physics works!

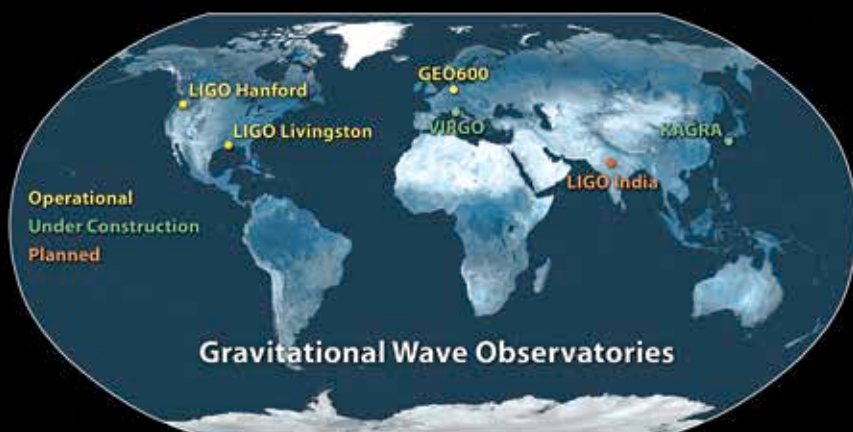
Now that the first observations have been made, it is possible for scientists to observe phenomena that occur at intergalactic distances. Any gravitational wave that is produced is matched to a series of templates that are computationally generated to match relativistic predictions of different events. When a match has been found for a particular signal, the experimentalists and the cosmologists can then theorise how the cosmic event occurred. In a lot of ways, this greatly improves the range of data that is available to scientists, who no longer have to depend solely on the radiation and emission of light spectra to analyse astronomical data.

It is imperative to not only improve the experimental apparatus at the current locations but also build more such interferometers for improved detection and noise

filtration. In a landmark project, the Union Cabinet of the Indian Government has nearly finalised a proposal to construct a similar experimental facility. The project is a joint venture by the LIGO Laboratory and three leading institutions in the Indian Initiatives in Gravitational-Wave Observations (IndIGO) consortium: Institute of Plasma Research (IPR) Gandhinagar, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune and Raja Ramanna Centre for Advanced Technology (RRCAT), Indore. LIGO USA labs have agreed to donate most interferometer components but the burden of building the entire infrastructure, facilities and interferometer vacuum housing, and then assembling, commissioning and operating the detector, lies in the hands of the Indian scientific community. According to Professor C Unnikrishnan of the Tata Institute of Fundamental Research, who is a key member of the LIGO India project, the project 'give(s) both scientists and industries technological goals that go beyond what is available or possible in the country today, leading to enhancement of technological capabilities'. The impact on higher education and research in Physics and

Astronomy is also expected to be monumental, due to what Prof Unnikrishnan termed an 'unprecedented potential for human resource development in several areas of physics, technology and engineering'. Professor Bala Iyer of the Raman Research Institute, also a key member of the project, hailed the proposal as a 'historical epoch' and believes that LIGO-India will be a 'critical element of the global network needed to inaugurate the new GW astronomy with the potential to impact R&D in the many technologies involved and in turn impact high precision experiments in many areas'.

The next few years will not only see a new experimental setup in India, it will also see many bright minds step up to take the mantle that has been created by this proposal. Gravitational wave observations hold the answers to many deep questions that trouble physics. The stimulus now exists for the next generation of physicists to step up and continue the noble quest of science to unravel the mysteries of the universe. 



LIGO Facility planned for India in the coming years

FB Messenger accepts Dropbox

Facebook Messenger now accepts dropbox files directly without having to copy and paste anything. <http://dgit.in/MDropBox>



LG Rolly Keyboard 2

New LG Rolly Keyboard has 5 rows now, the old keyboard rolling up to a square the new keyboard changes to a pentagon. <http://dgit.in/LGRK2>

The gift of sight

Vision processing units are helping unlock a whole new frontier in digital machines

Prasid Banerjee
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On August 31, 1999, when NVIDIA unveiled the GeForce 256, the company called it the 'world's first GPU'. According to NVIDIA's website, "A GPU represents a significant breakthrough in realism. It literally transforms the way you interact with your PC. It accomplishes this by completely offloading all graphics acceleration from the CPU." In essence, a GPU is a specialised chip, tasked with taking

the load off the CPU, in order to deliver a higher level of graphics. It was developed out of a need for such things in computers, where a single chip couldn't perform every task that it was required to.

It was a turning point in computing, leading to a whole lot of new computing features that we take for granted today. But as it was then, we stand today at another hurdle: The need for specialised chips is again apparent, thanks in no small part, to the obsolescence of Moore's Law. Until now, developments in the chip industry were driven by a prophecy made

by Intel co-founder Gordon Moore, which has led from the Intel 4004 (with around 2300 transistors embedded) to the Intel Skylake (with approximately 1.75 billion transistors embedded on it).

Moore's Law: *Processing power doubles roughly every two years, as smaller and more transistors are packed on a silicon wafer. This boosts performance and reduces costs.*

Death of Moore's law and the rise of VPU

"Broadly speaking, yes," says Jack Dashwood, Marcom Director, Movidius,



Outlook enters Android Wear

Microsoft's Outlook email app has been launched for Android Wear Devices making it easier to reply with pre-set messages. <http://dgit.in/OutDev>



China's realistic robot

China's realistic robot Jia Jia revealed which can have conversations with humans and can even pose for pictures. <http://dgit.in/JiaJiaR>

From the labs

when asked whether the obsolescence of Moore's law plays a part. "We are increasingly less reliant on the implicit benefits provided by moving down to a new process node. Purpose built processors and perhaps even more importantly, elegant marriage of software on top of the underlying silicon is going to be a huge source of improvements going forward, both from a technological and economic perspective."

Movidius is a small chip startup that you've never heard of. It's an European company that currently produces specialised chips, known as Vision Processing Units (VPUs). The chips are meant for application in areas like Augmented Reality, Virtual Reality, etc. Movidius' Myriad 2 chip is running on the recently announced DJI Phantom 4 drone and its Myriad 1 chip was used in Google's first Project Tango device. Dashwood explains that while Movidius is a decade old company, it turned its attention to VPUs in 2009, with Google's first Project Tango phone being the first time its chips were implemented. The Myriad 1 and Myriad 2 are high performance, but low power chips, meant specifically for Computer Vision.

The failure of Moore's law has led companies to look at new methods of extrapolating trends at the silicon level. The Myriad 2 chip is one such promising example. VPUs like the Myriad 2 don't sound like much, but like GPUs, they come out of a specific need for computer vision. Computer Vision is a branch of computing that deals with processing and understanding real world elements and images. It's the technology behind the myriad of augmented reality apps that you see today, like Blippar. It's also important in intelligent drones and robots that can navigate around real world obstacles and interpret real world objects by themselves.

"GPUs are actually quite a good analogy. In the early 90's, people realised that 3D gaming and visualisation was going to be hugely important for both commercial and consumer purposes, but existing architectures were not well suited to the types of computation required for rich graphics. In a similar vein, we are



A Vision Processing Unit or VPU

now keenly aware of the value of computer vision, but much of the existing hardware and software approaches aren't optimised for such tasks," says Dashwood.

VPUs are to Computer Vision, what GPUs are to gaming and graphics.

Obstacles to overcome

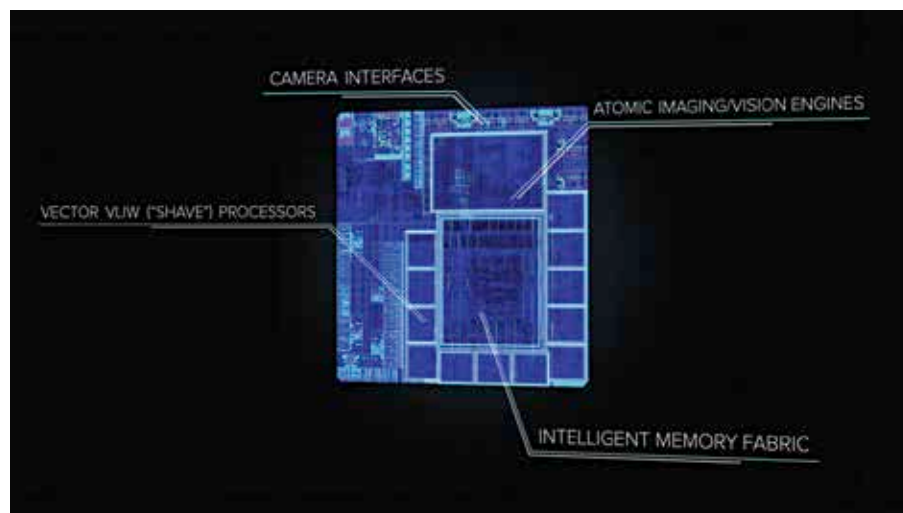
Using a specialised chip for a particular purpose is easier said than done though. Gamers usually use complex liquid cooling techniques in order to meet the heat requirements that GPUs come with. But while GPUs were originally meant for PCs, where there was enough space to implement such cooling methods, VPUs do not enjoy that luxury. They

are meant for drones, smartphones and other smaller devices. They are meant to be an integral part of the mobile environment that the world is rapidly progressing towards.

According to Dashwood, that problem is already solved. "The Myriad 2 is developed from the ground up to run in a low power envelope, and at temperatures low enough that they can be embedded on wearable devices." The Myriad 2 can process millions of pixels, while consuming less than one watt of power. This is significantly lower than the power consumed by smartphone processors today and is necessary for a chip that is supposed to run alongside those processors. In essence, while the multi-core processor on your phone will be responsible for the fast boot-up of an augmented reality app, the VPU will be responsible for what that app does.

Heat isn't the only hurdle though. The problem with implementing specialised chips is that it's harder to program for them. Dashwood explains that the Myriad 2 is aimed at device manufacturers who are already competent in this realm. Programmability of the chip shouldn't be confused with end-user applications running on the Android OS, he says.

The computing industry is no stranger to specialised logic though. Intel's newest chips have special programming, meant for videos and other tasks, MediaTek's Helio chips come with the CorePilot algorithm to improve performance,



VPUs help improve the camera quality of smartphones



Wearable Extra thin LED

University of Tokyo researches have invented extra thin LED's (3 micrometers) which blend with your skin. <http://dgit.in/SknDisp>



Customise Your Nexus Case

Nexus users can now customise and make their own smartphone cases using the Play Store. <http://dgit.in/Nxscase>



Drones can now actually "see" thanks to VPUs

Qualcomm, the biggest name in smartphone SoCs, recently introduced a bunch of enhancements made to its chips using specialised algorithms. In its data centres, Microsoft uses a specialised FPGA (Field-Programmable Gate Array) chip for Bing. The company told The Economist that it has doubled the number of queries a server can process in a given time.

Given the DJI Phantom 4's proficiency in obstacle avoidance and Google's recent showcase of the Project Tango devices, it seems like the industry has overcome this hurdle as well.

Lastly, Dashwood says that VPUs take almost no discernible space, which makes it easier to implement into smaller devices such as smartphones and smartwatches.

"The additional sensors often involved are much larger considerations when it comes to space," he says.

Application in virtual reality

While the implementation of VPUs in augmented reality is apparent, the industry today has been primarily focusing its attention on virtual reality. For starters, a VPU can help make Virtual Reality headsets less bulky, says Dashwood. More importantly, it can add a ton of ways for Virtual Reality applications to interact with the real world. Room-scaling in HTC's Vive headset is one such example of how virtual reality can work in conjunction with the real world. Think of it as a union between Virtual and Aug-

mented Reality. What if the virtual space was built around your real space?

"VPUs can help in 'all sorts of areas'", says Dashwood. He lists a positional tracking, gesture, environment mapping, eye tracking and object classification as a few examples. These are some of the essential components of Virtual Reality today. If your environment can be effectively mapped, then the virtual reality space a headset like the Oculus Rift takes you to, can be built around it.

This means if you're in your living room, your Minecraft game will be built based on things in it. Thinking back to the legendary Age of Empires games, imagine players in a single house, building their empires in separate rooms of the house, while the doorways act as borders between their empires.

Microsoft's Hololens is another area where VPUs can come in handy. The augmented reality headset seems to be one of the best things to have come out of Microsoft's stables recently, and it essentially depends on recognising the real world and then overlaying the virtual on top of it.

VPUs are not just possible for VR, they're almost essential.

Application in smartphones

VR though is still about a year or so away from truly coming to the mainstream and consumers today are still more focused on smartphones. A very interesting possibility for VPUs in smartphones is in improving cameras on them. "Computational photography is an obvious application," says Dashwood, "there are a great deal of ways of working around the physical limitations of optics running on various operations, to construct a visually pleasing photograph." According to him, computational photography has the potential to bring DSLR (or better) quality images to our smartphones.

In essence, Computer Vision allows your smartphone to understand the scene in front of you. So, a photograph clicked by the camera, which is based on the reflection and refraction of light waves from various objects, can be improved. A photograph can be passed through additional processing, adding inputs from the VPU, to generate more realistic representations.



Don't try this at home, or at least not without a safety drone



Apple Nets 40 million dollars

Apple's Recycling Program mints \$40 Million in Gold from unwanted or broken apple devices.

<http://digit.in/Apple40m>

Microsoft adds Offline Translation

The latest version of Microsoft Translation supports offline translation with a simple download of offline language packs.

<http://digit.in/Moffline>

From the labs



VPU will keep your smartphones as slim as ever

This could help in two things -- the first, in enhancing camera quality without making your phone thicker. One of the main reasons why smartphones can't reach DSLR quality are their space constraints. You can not fit large enough lenses or sensors into them. VPUs, potentially, can solve this. Secondly, it could also improve low light photography, a major area of focus for smartphone OEMs. While a lot of advancements have been made by companies like Apple and Samsung, low light remains the bane of smartphone cameras, and VPUs may help here as well.

Brains and brawns

Perhaps the most interesting and potentially scary implementation of VPUs though is in machine learning. A neural network of machine learning algorithm replicates the human brain and a VPU can

act as the eyes for that brain. On January 27, 2016, Movidius announced that it is working with Google to accelerate the adoption of deep learning within mobile devices. The partnership gives Movidius access to Google's neural network technology roadmap, while the Search giant will source Movidius' processors and entire software development network.

"What Google has been able to achieve with neural networks is providing us with the building blocks for machine intelligence, laying the groundwork for the next decade of how technology will enhance the way people interact with the world," said Blaise Aguera y Arcas, head of Google's machine intelligence group. Arcas said that working with Movidius has allowed Google to expand its technology out of data centres and into the real world.

Google is using the MA2450, which is the most powerful iteration of Movidius'

Myriad 2 chip for this purpose. According to Remi El-Ouazzane, CEO, Movidius, the biggest challenge in embedding the technological advances Google has made in machine intelligence is in extreme power efficiency. This needs deep synthesis between the underlying hardware architecture and that is where the neural computer comes in.


In an interview with Digit, David Silver, Research Scientist on Google's Deep Mind, said that it's the early days for Artificial Intelligence and we are "decades away from human level AI". Silver heads the team that developed Deep Mind's AlphaGo algorithm, which recently beat Go champion Lee Seedol, in a best of five tournament. Dashwood says that machine learning and VPUs go hand-in-hand.

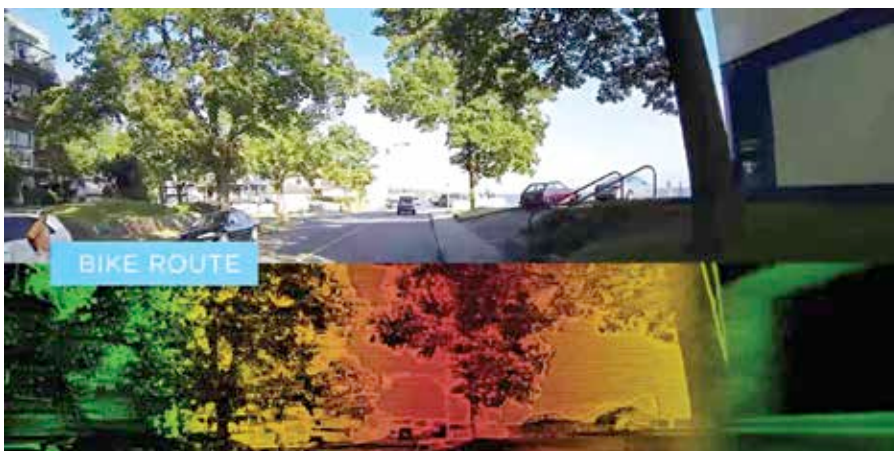
VPUs will, in future, make for an integral part of artificially intelligent robots, working as the eyes for the neural networks to work with.

The booming market

Adding the proverbial cherry on the cake, the Computer Vision and VPU market is at a nascent stage, but it's booming. Google and DJI are two of the best and biggest known names, but there are still many others exploring these avenues. Dashwood says that currently, Movidius, is the only viable solution in markets right now that presents low power, low thermal characteristics and high performance.

According to him, the company's chief competitors come from the GPU and CPU market, as in some cases, they may make for viable solutions for computer vision requirements. "In some instances, a CPU or GPU might make for a viable solution for high performance, OR, low power, OR, low thermal characteristics... but all three at the same time? We think we are the only viable solution right now," said he.

The Movidius MA2450 mentioned above is the only commercial solution for computer vision available on the market today. While VPUs won't offset chip-makers like Qualcomm, MediaTek and Intel, and they also won't compete against NVIDIA and AMD in the GPU segment either, they are however creating a whole new segment for themselves. 



Recreate a virtual replica of the real world with the aid of VPUs

Recommended buys

The very best products you can buy right now spanning 10 categories including gaming mice, graphic and sound cards, and E-Readers

Killer rigs

Building a rig? Don't know what components to include? Fret not, we'll sort you out

To print or not to print?

Brace yourself! Agent goes printer shopping and reports his finding

Agent 001

agent001@digit.in

Quite literally, and this is no exaggeration, but last month my trusty old printer broke down after close to a decade of solid performance. It just slowly whined, sputtered erratically and went eerily silent. So much for goodbyes, eh?

What that left me to do was to find a replacement printer real quick. Although I have been following the advancement in printer technology just like any other, I hadn't really tried to go hammer and tongs on a printer simply because I never had any real need to address. Without wasting any time, I got my hands on three top-selling printers in the market, one each from Canon, Epson and HP.

Epson L455, HP Deskjet Ink Advantage 4535, Canon Pixma G2000 are all multi-function printers which offer print, scan and copying capabilities out of the box. All three printers are relatively new into the market and are ideal for home users.

While the Epson L455 comes with its ink tank technology – where the ink needed to print documents and photos sit in bottles – the HP Deskjet 4535 comes with traditional colour cartridges. The Canon seems to offer a bit of a mix of both HP and Epson sport, from what I could tell. Of all the three printers, HP had the most features – like email print, Wi-Fi print, touch screen dial.



All three printers were relatively similar when it came to printing our 64 page DMystify. In terms of quality, there was a very close race between the HP and Canon – especially when it came to printing pictures on glossy and matte papers. The HP Deskjet 4535 churned out better quality high-resolution photos on A4 matte paper, while Canon enjoyed the upper hand when it came to printing the same photos on glossy sheets. The difference was distinctly apparent. The HP printer's ink consumption was highest of all three, but hey the results showed as to why.

It's all in the cost

I'll let you in on a secret of the printer industry. When it comes to ink-tank and laser printers, the total cost of ownership or TCO is the most important aspect that matters, forget everything else. This is where manufacturers make most money. Most manufacturers claim that their print rates are around ₹1 to ₹5 per page,


and that's true, but that rate is almost exclusively determined by the cost of the cartridge and its yield. What do you do when you have a choice between a ₹5000 printer that yields prints at ₹1 per page and one that costs ₹10000 and yields prints at ₹0.5 per page?

Here's what you do (considering a laser printer):

- Cost of printer: X
- Cost of cartridge: Y
- Page yield of cartridge: Z
- Your estimated print volume per year: A
- Estimated life of printer (years): 3 (going by the average warranty period, but you can choose a figure of your liking)
- Estimated print volume over the life of the printer: 3*A
- Number of cartridges required over the life cycle of the printer: (3*A)/Z
- Total cost of cartridges required:
 $B = Y * ((3*A)/Z)$

Therefore, the Cost of Ownership would be as follows:

$$COO = (X + B)/(3*A)$$

Everything else being equal, the lower this value, the better. For colour printers, you need to estimate the number of colour vs. black and white prints that you'd use and expand the formula to account for the cost of colour cartridges. Especially if you'll need CMYK cartridges. 

	Epson L455	HP Deskjet Ink Advantage 4535	Canon Pixma G2000
Cold Boot (sec)	35.99 sec	35.05 sec	24.77 sec
DMystify (sec)	683.11 sec	419.55 sec	539.17 sec
Photo (sec) (1 copy)	98.18 sec	140 sec	48.03 sec
Colour scan (300 DPI)	25 sec	20 sec	38 sec
Colour copy (sec)	38 sec	39 sec	71 sec

Price watch

This month we take a gander at Wireless Routers and SSDs. Use this guide to get the prices right



RebelMouse

Rebel Mouse has come up with a new tool – Rebel Discovery that helps them to identify social media accounts. <http://dgit.in/RebelDiscovery>

Agent 001

Smart watch of band?

Hey Digit,

I just passed my 10th examinations and I'm looking forward to buying a smartwatch. Although I had earlier thought of getting a simple watch. Coming straight to the point, my budget is ₹5,000 so I'd like to keep it below that. Are there any smartwatches in the market that are worth considering in this segment? A smartband (the likes of Mi band and Fitbit bands) in the same price segment may also be good.

–Ram Makhijani



Sony SWR10

A Hey Ram, In this budget, you're pretty much destined to be disappointed if you get a smartwatch. Everything seems to be poorly made and very few smartwatches have an accompanying app which is in English. Moreover, since there is a lack of uniformity in terms of connectivity standards, your smartwatch might not be fully compatible with your existing smartphone. So while remote calling might be functional, you might not be able to get notifications or vice versa. Smartbands are a lot more suited for this price band since you get better built devices with sensors that are better calibrated. You can opt for a Smartband without a display like the Sony Smartband SWR10 or one with a display like the GOQii fitness tracker.

Phone under ₹7k

Hey Agent001, My exams are over and my parents want to gift me a mobile phone under 7k. Can you suggest a good one?

–Sagnik Sengupta



Coolpad Note 3 Lite

A Seems like more and more folks are getting incentives to perform well in their board examinations. I remember when it was my time to write these papers and for me it was more like being between a rock and a hard place. A rock 'cause I'd have been kicked out, and a hard place because I'd have been thrashed by my folks. *sigh* It's nice to see things have changed. Coming to your question, there are two mobile phones suited to your budget. There's the Coolpad Note 3 Lite, Meizu M2 and the Acer Liquid Z530 which all cost the same and are within your budget. It has a 5-inch 720p display and 3 GB of RAM propped up by a 1.3 GHz MediaTek MT6735 SoC. It looks quite good as well so we don't see any downsides.

Laptop for ₹45K

Hi Agent 001,

I am in need of durable, portable laptop that can sustain extreme working conditions in the likes of several open documents, minimum maintenance as in, no shut down only sleep, and should play HD videos as well in crisp quality! So essentially, great display, great multitasking capabilities, and low maintenance!

I am confused between HP, Lenovo and Dell, which brand to go for. Hearing overheating problems in Dell, is the word of mouth review real? Also, I was thinking about IdeaPad, would it be worth the investment considering the qualities I am looking for. My budget is strictly 45000 inclusive of taxes! I won't be needing any OS, so cost can be saved on that.


Also would it be beneficial in purchasing online or in brick and mortar? I live in gurgaon. Would be buying it by end of this month, so hoping for some sage wisdom in deciding long term investment of laptop from the best :).

Thanks in advance,

–Aayush Shrut



HP Notebook 15-ac179tx

A Hey Aayush, That quite a list of demands and we're glad you've been specific about the laptop's specifications. So we tried looking for laptops within your budget and it seems like Dell is comparatively expensive while HP and Lenovo seem to be within your budget. We found the HP Notebook (15-ac179tx) and the Lenovo Ideapad 300 (80Q700UEIN) to be most appropriate for your needs. We tried comparing the two devices against each other based on the specifications mentioned on the website, unfortunately, Lenovo's website doesn't offer a detailed specification list like what HP has on their website. So HP seems to be the better option. It has a sixth generation Core i5 - 6200U and a AMD M330 GPU so it'll be more than capable of handling whatever tasks you can throw at it. 

digit RECOMMENDED BUYS

From smartphones to graphics cards, here's what we recommend for your next purchase!



TOP 3 ULTRAWIDE CURVED FREESYNC MONITORS

Brand	Model	Price (in ₹)
Acer	XR341CK	89,999
BenQ	XR3501	96,999
Dell	U3415W	98,950



TOP 3 2-IN-1 LAPTOPS

Brand	Model	Price (in ₹)
Microsoft	Surface Pro (i7-6650U)	1,44,990
Lenovo	Yoga 900 (i7-6500U)	1,23,690
HP	Spectre X360 13 (i7-5500U)	1,24,998



TOP 3 WIRELESS GAMING MICE

Brand	Model	Price (in ₹)
Logitech	G602	4,899
Logitech	G700S	8,629
Razer	Naga Epic	7,569



TOP 3 GRAPHICS CARDS (UNDER ₹20K)

Brand	Model	Price (in ₹)
Sapphire	R9 380	21,500
ZOTAC	GTX 960 AMP!	17,500
Sapphire	R9 285	18,900



TOP 3 PC SOUND CARDS

Brand	Model	Price (in ₹)
ASUS	Xonar Essence STX	10,720
Creative	Creative Sound Blaster Z	10,413
ASUS	Xonar DX	6,499



TOP 3 MIRRORLESS CAMERAS

Brand	Model	Price (in ₹)
Sony	α7R II	2,39,900
Samsung	NX1	2,39,900
Leica	SL	1,26,499



TOP 3 CAMERA SMARTPHONES

Brand	Model	Price (in ₹)
Apple	iPhone 6s Plus	49,999
Samsung	Galaxy Note 5	42,900
Sony	Xperia Z5	39,880



TOP 3 NOISE CANCELLING HEADPHONES

Brand	Model	Price (in ₹)
Bose	Quiet Comfort 25	25,200
Bose	Quiet Comfort 20	15,120
Plantronics	BackBeat Pro	11,250



TOP 3 E-READERS

Brand	Model	Price (in ₹)
Amazon Kindle	Voyage	16,499
Amazon Kindle	Paperwhite (2015)	8,999
Barnes & Noble	Nook Glowlight	9,000



TOP 3 TOP 3 4K TVs

Brand	Model	Price (in ₹)
LG	65EF9500	5,79,900
LG	65EG9600	5,81,719
Samsung	UA78JS9500	1,049,900

■ Basic rig = ₹30,631 ■ HTPC = ₹31,388 ■ Entry-level gaming = ₹51,612 ■ Mid-range gaming = ₹77,554 ■ Ultra high-end = ₹2,61,643 ■ Digit Test Rig = ₹4,40,591

BASIC RIG

Processor	Intel Core i3 - 6100	8,650
Motherboard	ASRock H170A-X1/3.1	8,969
RAM	G-Skill Value F4-2133C15S-4GNT	1,309
HDD	Toshiba 1 TB DT01ACA100	3,385
Graphics Card	Intel HD Graphics 530	0
PSU	Corsair VS450	2,375
Speakers	None	0
Optical Drive	None	0
Mouse	Logitech MK120 Wireless (Bundle)	843
Keyboard	Logitech MK120 Wireless (Bundle)	0
Sound Card	None	0
Sub-total	(Excluding Monitor)	25,531
Monitor	Acer P168HQL	4,100
Cabinet	OEM Cabinet	1000
Total		₹30,631

HTPC

Processor	AMD A10-7850K	11,075
Motherboard	MSI A88XM-E35	5,600
RAM	G.Skill RipjawsX DDR3 4 GB (2 x 2 GB) PC RAM (F3-14900CL9D-4GBXM)	1,993
HDD	Western Digital WD30EZRX 3TB	7,690
Graphics Card	AMD R7 (512 Cores)	0
PSU	Antec VP500PC 500W	2,838
Speakers	None	0
Optical Drive	LG GH24NSD1 SATA DVD Writer	1,050
Mouse	Logitech MK220 Wireless (Bundle)	1,142
Keyboard	Logitech MK220 Wireless (Bundle)	0
Sound Card	None	0
Monitor	None (your TV)	0
Cabinet	Corsair Carbide 88R	3,394
Total		₹31,388

ENTRY-LEVEL GAMING

Processor	AMD FX8320	12,199
Motherboard	Gigabyte GA-78LMT-USB3	4,200
RAM	ADATA AD3U1600C2G11-B 1600 MHz (2x 2 GB)	1,760
HDD	Seagate Barracuda ST1000DM003 1TB	3,731
Graphics Card	Sapphire R7 360 2GB	9,680
PSU	Corsair CX430 V2	3,031
Speakers	Philips MMS4040F - 2.1 Channel	3,033
Optical Drive	LG GH24NSD1 SATA DVD Writer	1,050
Mouse	Logitech MK200 (Bundle)	730
Keyboard	Logitech MK200 (Bundle)	0
Sound Card	None	0
Sub-total	(Excluding Monitor and Cabinet)	39,414
Monitor	BenQ RL2240HE	9,299
Cabinet	Antec X1-T Gaming	2,899
Total		₹51,612

MID-RANGE GAMING

Processor	Intel Core i5 - 6400 + Cooler Master Hyper TX3	15,749
Motherboard	ASRock H170A-X1/3.1	8,969
RAM	Corsair Value Select (2x 4 GB)	2,915
HDD	Seagate Barracuda ST1000DM003 1 TB + Kingston SSD UV300 120 GB	6,307
Graphics Card	Gigabyte GTX 960 N960WF20C	17,790
PSU	Antec VP650P V2	4,340
Speakers	Sony SRS-D9 2.1	4,990
Optical Drive	LG GH24NSD1 SATA DVD Writer	1,050
Mouse	CM Storm Devastator (Bundle)	2,639
Keyboard	CM Storm Devastator (Bundle)	0
Sound Card	None	0
Sub-total	(Excluding Monitor and Cabinet)	64,749
Monitor	BenQ RL2240HE	9,299
Cabinet	Corsair Carbide SPEC 01	3,506
Total		₹77,554

ULTRA HIGH-END GAMING

CPU + Cooler	Intel Core i7-6700K + Antec Kuhler H20 650	32,386
Motherboard	ASRock Z170 Extreme6	16,499
RAM	Corsair Vengeance (2x 8 GB) CMK8GX- 4M1A2400C14R	6,000
HDD	WD WD30EZRX 3TB + Samsung 850 Pro 256GB SSD	17,689
Monitor	Acer XB270HU 27-inch 144Hz 4K G-Sync	61,300
Graphics Card	GALAX GTX 980TI HOF 6 GB	58,000
Cabinet	Cooler Master MasterCase 5	9,249
PSU	Corsair RM1000i 1000W	13,298
Speakers	Logitech Z906 5.1	17,990
Optical Drive	LG Blu-ray WH14NS40 RW	5,999
Mouse	Logitech G502 Proteus Core	3,689
Keyboard	Steelseries APEX RAW	8,824
Sound Card	ASUS XONAR Essence STX	10,720
Total		₹2,61,643

PRIMARY DIGIT TEST RIG

Processor	Intel Core i7 - 5960X (Extreme Edition)	87,800
Motherboard	ASRock X99E-ITX/AC	22,500
RAM	Apacer Panther 2666 MHz 32 GB (4x 8 GB)	15,840
HDD	Western Digital WD40EFRX	13,050
SSD	SanDisk Extreme II 240GB	34,000
PCIe SSD	Intel 750 NVMe + Kingston HyperX Predator 480 GB	119,275
Graphics Card	Gigabyte GTX 980 Ti Extreme Gaming	68,400
Cabinet+ Cooler	Cabinet (NA) + Noctua NH-D15	8,199
PSU	Corsair RM1000X	13,899
Monitor	LG 29UC97C	40000+Tax
Optical Drive	NA	NA
Mouse	Mionix Castor	4,700
Keyboard	Corsair STRAFE	12,490
Total		₹4,40,591



Stream through flesh

Using ultrasound, data can be transferred through flesh at a speed of 30 Mbps.
<http://dgit.in/UltraSnd30>



Google Maps Update

Google Maps' new update provides better traffic updates along with spoken alerts now.
<http://dgit.in/GMapsUpdtd>

SPEND SMART

Are you on the lookout for a better router or perhaps you want to speed up your laptop or desktop with a brand spanking new SSD. Here are some selected units you might want to consider.



WIRELESS ROUTERS

Brand	Model	Band	Rated Bandwidth	Protocol	ADSL (Y/N)	LAN Ports	USB Port	Price (in ₹)
TP-Link	TL-WR841N	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,070
Tenda	N301	Single	300 Mbps	802.11n	N	3x 100 Mbps	N	685
D-Link	DIR-615	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,369
NETGEAR	WNR614	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,055
Digisol	DG-HR3400	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,025
ASUS	RT-N 12+	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,045
Linksys	E900	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,900
TP-Link	Archer C2	Dual	750 Mbps	802.11ac	N	4x 1 Gbps	1x USB 2.0	3,430
Digisol	DG-BR4400AC	Dual	750 Mbps	802.11ac	N	4x 100 Mbps	N	2,639
D-Link	DIR-820L	Dual	1200 Mbps	802.11ac	N	4x 100 Mbps	1x USB 2.0	4,949
TRENDnet	TEW-810DR	Dual	750 Mbps	802.11ac	N	4x 100 Mbps	N	5,799
NETGEAR	D6000	Dual	750 Mbps	802.11ac	Y	4x 1 Gbps	1x USB 2.0	6,300
Belkin	F9K1116zb	Dual	750 Mbps	802.11ac	N	4x 100 Mbps	2x USB 2.0	6,999
Linksys	X1000	Single	300 Mbps	802.11n	Y	3x 100 Mbps	N	4,625
Tenda	TE-F300	Single	300 Mbps	802.11n	N	4x 100 Mbps	N	1,069

SSD



Brand	Model	Form Factor	NAND	Controller	Capacity	Max. Seq. Read	Max. Seq. Write	Price (in ₹)
Samsung	850 EVO	SATA 2.5-inch	3D V-NAND	Samsung MGX	120 GB	540 MB/s	520 MB/s	4,449
SanDisk	SSD Plus	SATA 2.5-inch	MLC	NA	120 GB	520 MB/s	180 MB/s	3,199
ADATA	Premier Pro SP550	SATA 2.5-inch	TLC	SMI	120 GB	560 MB/s	410 MB/s	2,999
Kingston	UV300	SATA 2.5-inch	TLC	Phison S10	120 GB	550 MB/s	510 MB/s	2,749
Corsair	Force LS	SATA 2.5-inch	MLC	Phison PS3108	120 GB	535 MB/s	440 MB/s	4,249
Samsung	950 PRO	M.2 2280	3D V-NAND	Samsung UBX	256 GB	2200 MB/s	900 MB/s	17,899
Kingston	HyperX Predator	M.2 2280	Toggle	Marvell 88SS9293	240 GB	1400 MB/s	600 MB/s	18,499
Samsung	T1	USB 3.0 External	3D V-NAND	Samsung MGX	250 GB	450 MB/s	450 MB/s	9,999
SanDisk	Extreme 500	USB 3.0 External	MLC	NA	240 GB	415 MB/s	340 MB/s	9,299
LaCie	Rugged Thunderbolt	Thunderbolt+USB 3.0		NA	250 GB	387 MB/s	387 MB/s	23,349
Samsung	EVO	mSATA	3D V-NAND	Samsung MGX	250 GB	540 MB/s	520 MB/s	8,549
Transcend	MTS800	M.2 2280	MLC	TS6500	256 GB	560 MB/s	310 MB/s	8,499

Smart SoHo

Software is an easy area to can save money on, when starting a new business. Here's how.

**ClassDojo raised \$21M**

ClassDojo just raised \$21M in Section B to make tech that makes Teachers and Parents meet. <http://dgit.in/Classdojo>



Beating Go and the road ahead for AI

We sit down with Deep Mind's David Silver speaking about Google's AlphaGo AI, its huge step towards achieving artificial intelligence and its future plans.



David Silver,
Research Scientist, Deep Mind

Prasid Banerjee
prasid@digit.in

Firstly, could you explain the significance of AlphaGo's victory over Lee Seedol? Why does a victory in Go matter so much?

David: Go represents a major milestone in AI research. Go is enormously complex, and such an intuitive game that so-called "brute force" search techniques are not sufficient. Until recently, computers have only played Go as well as amateurs. Go's simple rules and profound complexity resemble the real-world in many ways. Therefore we think Go is an important stepping stone towards a more general AI.

How does AlphaGo's victory in Go differ from Deep Blue's victory earlier. How do Chess and Go differ when it comes to being played by an AI?

David: The number of possible moves in chess is much lower. The search space in Go is vast – more than a googol times larger than chess (a number greater than there are atoms in the universe!) So traditional "brute force" AI methods, which construct a search tree over all possible sequences of moves, don't have a chance in Go. In addition, it's easier to evaluate who is ahead in chess

Human grandmasters handcrafted the chess knowledge used by Deep Blue

to evaluate chess positions. For AlphaGo, we did not program what strategy to use – instead it learnt for itself from hundreds of thousands of human expert games, and from millions more games of self-play. Finally, Deep Blue used a search algorithm that was based more on brute force – it evaluated thousands of times more positions than AlphaGo. Instead, AlphaGo searches much more smartly and selectively.

AlphaGo has two neural networks working inside it. Could you explain these and how they work?

David: One neural network, the "policy network," selects the next move to play. The other neural network, the "value network," predicts the winner of the game. Each neural network takes the board position and passes it through many computational layers with millions of tunable weights, to come up with its answer.

AlphaGo's gameplay has been described as aggressive in the tournament. How does it do that? Why is that significant? Is there no rule-based programming at play here?

David: AlphaGo always selects the move that maximises its chances of winning the game. This can sometimes result in aggressive moves, but can also sometimes result in seemingly quiet and defensive moves

How easy or difficult will it be to adapt AlphaGo to other activities?

David: The methods we've used for AlphaGo are general-purpose, so our hope is that one day they could be extended to help us address other challenges from making smartphone assistants more useful to helping scientists with some of society's toughest and most pressing problems, from climate modelling to complex disease analysis. That being said, it's very early days. We are decades away from human level AI.

If yes, does that make it difficult to scale or adapt AlphaGo to other applications?

David: This is the beginning, and there is a lot more work to be done before we can begin to apply these techniques to real world problems. But with the right developments it isn't impossible to have such implications.

Do you plan things like AlphaGo to be used for consumer applications, like in smartphone voice assistants?

David: Not necessarily AlphaGo, but the machine learning techniques will be a tool that helps us do what we already do, but better – whether that's instant translation, a smarter assistant on our phone that can plan a trip for us just by knowing what we like or by helping doctors to diagnose a disease much earlier. **d**

Microsoft sues US government

Microsoft has sued US government over the order which allows cops to see customer email and records.
<http://dgit.in/microsueus>

**GMO Food**

The latest Genetically Modified Food White button mushroom is edited using CRISPR.
<http://dgit.in/CRISPRX>



Lifeblood for your system

Taking the human body inspired designs to a completely another level, Dr. Bruno Michel, IBM Research, Zurich tells us about his research and the development of a blood like technology for computers.



◀ Dr. Bruno Michel,
IBM Research

Prasid Banerjee
prasid@digit.in

How long has electronic blood been under development?

Bruno: The actual project name is called REPCOOL, which is short for “Redox flow electrochemistry for power delivery and cooling”. The project was awarded a grant from the Swiss National Science Foundation in September 2013 and in addition to IBM Research, other partners on the project include ETH Zurich, the Paul Scherrer Institute and the University of Lugano.

The general concept has been something I first began focusing on in 2006 when the Stern Reporter was released. This triggered me to pivot my research towards inventing incredibly powerful computers, which are densely packed and therefore very energy efficient using 3D chip stacks.

You can read about his vision in this paper:
<http://dgit.in/FDSscaling>

How does it do both energy delivery and cooling at the same time?

Bruno: This groundbreaking approach is modelled after the structure and power supply of the brain, where blood capillaries serve both to cool it and to supply it with energy. Compared to today's top computers, however, the human brain is roughly 10,000 times denser and 10,000

times more energy-efficient. The research team believes that their approach could reduce the size of a computer with a performance of 1 petaflop/s from the dimensions of a school classroom to that of an average PC, or in other words to a volume of about 10 liters.

To cool 3D chips efficiently, IBM scientists have already developed fluid-cooled test systems with capillary cooling structures that allow the fluid to flow between the individual chip layers, a process called “interlayer cooling” that achieves a cooling capacity of 3 kW/cm³.

The research team now takes this approach one step further by developing an integrated cooling and energy distribution system based on an electrochemical flow battery to address the power supply challenge in a sustainable way. Their approach is to distribute the energy electrochemically via what are known as redox chemicals in the capillary fluid instead of through electrical wires. Unlike conventional batteries, which store energy in solid electrode materials, a flow battery transports energy simply by circulating the redox chemicals. Thus the electrolytes are charged by an electrochemical cell called an electrolyzer and discharged via numerous distributed receiver electrodes on a single layer of a 3D chip stack. Large electrochemical flow batteries of this kind already exist for such purposes as grid-

scale electricity storage from renewable sources, but this technology must still be significantly improved and miniaturized for use in future chip stacks.

What is electronic blood made of? What would we call it, if we were to give it a technical name?

Bruno: The technology is called a Redox Flow Battery, which has been around for several decades and the liquid we are using is primarily vanadium.

While the primary suggested use for this is in data centers and supercomputers, do you think such a system can be used in consumer devices, like smartphones and tablets, in future?

Bruno: The research the team develops within the REPCOOL project will scale from supercomputers to cloud computers and wearable devices, but it's too early to make any predictions at this point.

What are the major challenges in the application of such a technology?

Bruno: To answer this question I would like to cite the following paper I co-authored titled - Integrated Microfluidic Power Generation and Cooling for Bright Silicon MPSoCs <http://dgit.in/IMPGBCSM>

To allow a full electrochemical power supply of chip stacks from the same footprint a two pronged approach is



Snapchat sticker update

Snapchat recently updated their app with motion tracking stickers that move with you.
<http://dgit.in/Snpchtupdt>



Project Escher

With Autodesk's Project Escher, the company is looking to the future of 3D printing.
<http://dgit.in/ProjectEscher>

Industry Connect

needed: (1) The power density of processors has to be reduced by improved architectures that minimize data motion and (2) the power density of electrochemical power delivery has to be massively improved. An example of the first effort is in the increased on-chip specialization to provide less power hungry compute systems that are based on efficiency improvements and educated compromises in computation and performance. Such devices can now also be used as servers for memory bound applications with better efficiency compared to current servers.

For the second effort experimental investigations of electrochemical conversion in single-channel redox flow systems have been triggered to explore approaches to overcome power density limitations. We believe that future computers which additionally could be built around this fluidic power delivery scheme would be less power-intensive due to their reduced communication power demand. The fluidic means of removing heat allows considerable increases in packaging density while the fluidic delivery of power with the same medium saves the space used by hardwired power delivery. The savings in space allow much denser architectures, sharply reduced energy needs and latency as communication paths shrink. Together with the improved power densities of redox flow batteries it should be possible to deliver the complete power demand of high-performance, high-density, processing architectures.

Q With the obsolescence of Moore's law, would it be right to say that something like Electronic Blood is more important now than it ever was?

Bruno: Until now, the number of transistors on a chip and hence computer performance has doubled every 18 months in accordance with Moore's Law. The downside is that their power consumption has also grown at the same pace. This trend of ever-increasing computer performance is expected to be pushed to the zeta scale in the next few decades. Such systems would be able to perform 10^{21} — a 1 followed by 21 zeros — computational operations per

second, which is roughly 30,000 times more than today's best computer systems can do. However, based on current technologies, a supercomputer of this capacity would devour more than the entire global production of electricity.

IBM Research is investigating a number of promising research technology to address these challenges including quantum computing, neuromorphic computing, and nanotechnology. So these are all critical in addressing the end of Moore's Law, with each having different time horizons. The great strength of the "electronic blood" is that it is the final point of a new density roadmap that uses dense mobile and wearable packaging to get more compact systems and combines this with our research effort on 3D packaging to allow higher densification factors exceeding $1'000'000\times$. The roadmap starts immediately with the first proof points being the 1000x denser microserver. It builds on existing CMOS technology and is fully backward or legacy compatible in the software stack - capabilities that quantum computing and neuromorphic computing do not have. So we clearly can confirm that this density and electronic blood roadmap is much more important now than it ever was - in fact it replaces the obsolete Moore's law with a new "law" that is based on volumetric densification instead of areal densification.

Q How far away do you think we are, from actually seeing this technology being put to use?

Bruno: We hope to see the first applications around 2030.

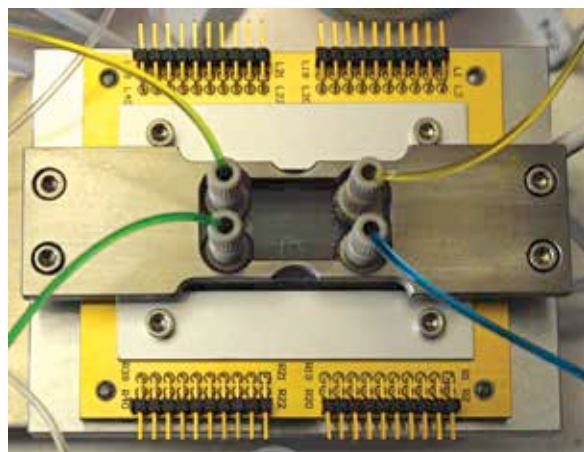
Q Can Electronic Blood also reduce the electricity consumption of a supercomputer, or does it act as a vehicle for transferring electricity?

Bruno: Yes, that is the goal. I address this answer in Q2.

This groundbreaking approach is modelled after the structure and power

supply of the brain, where blood capillaries serve both to cool it and to supply it with energy. Compared to today's top computers, however, the human brain is roughly 10,000 times denser and 10,000 times more energy-efficient. The research team believes that their approach could reduce the size of a computer with a performance of 1 petaflop/s from the dimensions of a school classroom to that of an average PC, or in other words to a volume of about 10 liters.

Electronic Blood acts as a mediator of energy, not an energy source. However, by enabling to build computer systems with much higher density per unit volume, the resulting energy consumption of the computer for transferring power and com-



Single-channel test chips used by IBM researchers

municating data can be reduced, resulting in a higher overall efficiency. Further, Electronic Blood could allow to reduce the number of voltage transformation steps in a datacenter.

Q Lastly, the technology obviously tries to replicate human blood, how important do you think it is, in the field of Artificial Intelligence?

Bruno: The concept is not tied to a specific field of computing or even device technology, as it primarily addresses the way a computer is powered and cooled.

Any applications requiring computers to process large amounts of structured and unstructured data can benefit from the technology we are developing in REPCOOL, because it will let users explore this data faster, using less energy. **Q**



Skype on Web

Skype unveiled its Webservices update, that means you need no plugin to use these services from now. <http://dgit.in/skypeupd>



Play Music Podcasts

Google has finally launched Podcast feature on its music app, Google Play Music. <http://dgit.in/PodPM>

SAVE MONEY ON SOFTWARE



Looking for cost effective alternatives to the popular office tools? Or simply don't want to be too mainstream? Here are the best alternate tools for your business.

DOWNLOAD



Arnab Mukherjee

arnab@digit.in

Think office productivity software suites, 9 out of 10 times you would probably think of Microsoft Office. Think Creative Design software, the Adobe Creative Suite would definitely pop into your head first. Try to look for CRM Software, we are quite sure that the search results will be crowded with the likes of SAP and Salesforce.com. These mainstream leviathans have a stranglehold on their areas of expertise which is difficult to escape, especially

now when they have been around for years and have gone on to define some job designations by themselves.

But these are often not the tools that you need. In fact, standard software suites often come with features and updates that are not used by maximum users at all. A complex, cluttered, all-powerful application may actually be harmful to a business that is starting up fresh, with its requirement for dedicated knowledge and training. Also, some of these mainstream software suites and applications are priced quite high, which might be troublesome for a fledgling business or an individual professional. For example, The Microsoft Office

2016 Professional Edition costs a hefty ₹30999 and the Adobe Creative Cloud Annual membership fee is ₹32,400INR. Those are quite big numbers considering that there are equally capable, if not better, alternatives available out there.

Office Productivity - LibreOffice

A fork of the OpenOffice project, LibreOffice is Open-Source and Free and is maintained by The Document Foundation. Available in 110 languages, it comprises of the usual set of word processing tools, presentation tools, spreadsheet tools, diagram and drawing tools. LibreOffice uses



Alphabet plans high-tech city

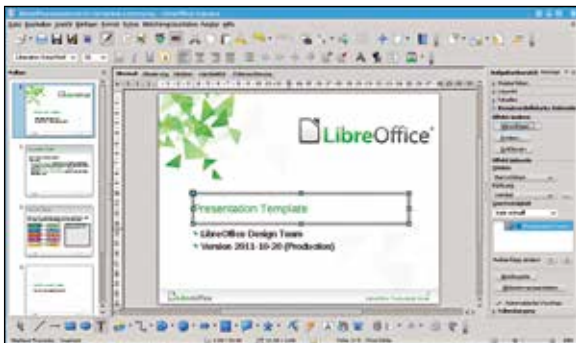
Alphabet's side labs are planning to build a full high-tech city which can house 'hundreds of thousands'. <http://dgit.in/AlphaHTCIt>



Apple helps the planet

Apple has planned to donate the funds it makes from 27 popular apps in the App Store to the World Wildlife Fund (WWF). <http://dgit.in/APsave>

Smart SoHo



LibreOffice is actually too good to be free

the ISO/IEC standard OpenDocument Format (ODF) as its own format to save all of its applications, along with a number of file formats from other popular suites that you can import from and export to.

If you look for a comparison between LibreOffice and Microsoft Office, you might actually get more than what you signed up for. For starters, LibreOffice 5.1 is available for Windows, Mac OS X, Linux, FreeBSD, NetBSD and OpenBSD, all with the same codebase, whereas MS Office is available for Windows and Mac OS X, that too with different codebases that lead to compatibility issues, along with factors like the OS X MS Office version not having MS Access. LibreOffice also comes in a portable format that can be directly used from a pendrive, which might be very useful in a small office scenario. There is also very strong integration of all Office components, with files of one application opening smoothly from files of another application and a centralized StartCenter. You will also get a centralized access page for any extensions that you may want to install. It is really one of the best alternates to a more common suite. And the best part – it's all for free.



GIMP is good enough for most needs

Photo Editing - GIMP

This one needs no introduction. GIMP has been quite well known as a free Photoshop alternative for a while, and its current version is a highly capable application with full scale photo editing and digital painting capabilities. It is completely open source and anyone can change its source code

and redistribute the changes. That is one of the reasons why there is a very rich ecosystem of plugins and addons available for GIMP that give it a host of capabilities. The GIMP Plugin registry contains plugins created by users worldwide.

While there are many use cases in which Photoshop is quite irreplaceable, it is also true that GIMP is a very useful and powerful alternative. For example, if you're on a tight budget and don't really need an extremely powerful photo editing tool at your disposal all the time, then GIMP is the best option you can take. It is definitely more powerful than the standard photo-editing options you get on apps like Instagram and Google Photos, and with the correct combination of extensions, you can do wonders with this popular Open Source application. The sweet bit - GIMP supports PSD out of the box, so you don't worry about your colleague sending you that WIP file.

Special Note - If you are on Linux, close your eyes and get GIMP.

Digital Illustration - Inkscape

One of the recurring names when it comes to free or low cost alternatives to Adobe Illustrator is Inkscape. With its native format being Scalable Vector Graphics (SVG), it is truly powerful in vector designing, with support for shape building,

gradient mesh and more. In a showdown with Illustrator, one of the first pain points that shows up obviously is the price, with an Adobe Illustrator license going for ₹12,000/year, compared to Inkscape being completely free. On the basis of features, it is a harder call to make because both have features that the other lacks. For example, Illustrator supports Gradient mesh and multiple strokes and fills for one object, whereas Inkscape supports editing the SVG source directly as well as treating shapes as objects.

Even when it comes to the user interface and user support available, Inkscape opts for simplicity and readability, which is often perceived by power users as a lack of actual capabilities. Keep in mind that both Inkscape and Illustrator are targeted



Still want to pay for Illustrator?

towards SVG development, which is mainly meant for web-usage, and not the heavier raster-graphics. In case you do want to try out Inkscape, here are a few interesting tutorials to get you started : <http://dgit.in/InksTut>

Special Note: Some of you might be wondering why we didn't put Coreldraw up here. Well, if you are shedding some features for a lower price, why not go all the way?

Desktop Publishing - Scribus

As an alternative to Adobe's desktop publishing software Indesign, Scribus is an open source tool filled with useful tools for all the publishing purposed that you might need it for – typesetting, print design, interactive PDF creation, layout design and more. The Scribus user



OSX to be renamed MacOS

Apple has just dropped some hints that there is a software rebranding in process, OS X will be renamed to MacOS <http://dgit.in/MacOS-Osx>



Drone racing coming to ESPN

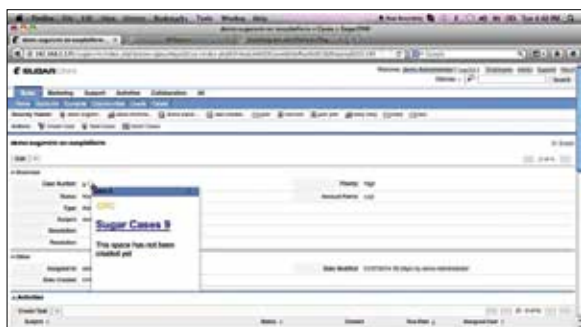
ESPN and IDRA have announced to broadcast drone racing on live TV, starting at New York for a three-day event. <http://dgit.in/DronRace>



Scribus is actually used a lot already

community provides a lot of standard templates that you can use in your projects, or you can go ahead and create your own. The interface is quite unique and gives you the ability to adjust the amount of space taken up by the program features and tools and the document that you are currently working on.

Scribus can easily take up a host of formats imported from mainstream applications. It includes CMYK support, spot colors and includes ICC profiles. It also lets you edit objects within document wide layers. Also, you can generate PostScript and PDF files from documents to perform checks before you send it for printing. Some unexpected additional features actually help speed up page layout. Especially, the drawing tools are quite powerful for a DTP, with predefined shapes and a polygon tool. You can even attach text to a path and flow text inside a shaped frame and even have linked frames in your multi-page document to ensure word-flow across the layout.



SugarCRM is exactly what small businesses need

The PDF/PostScript generation is exceptionally easy with just a one-click button calling up the export dialogue. You can even choose PDF/X3 which is

an ISO standard for the format. In fact, Scribus was the first application to support this feature.

Customer Relationship Management - SugarCRM

Since Salesforce.com launched at the beginning of the 2000s, it has been repeatedly cited as one of

the standard examples of Cloud computing at its best. In fact, it has gone on to replace some of the leading CRM solutions from market and business leaders of the time. In this day and age of entrepreneurship and customer-oriented products and companies, it is no surprise that a good CRM solution is in demand and something even small businesses cannot do without. On that note, you might want to take a look at an alternative that is more affordable than Salesforce and that is where SugarCRM comes in.

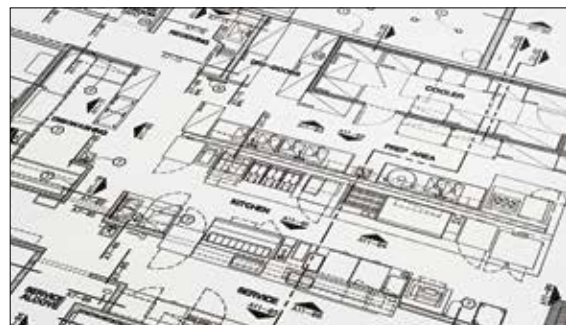
At a \$40 per user/month fee structure for the Professional Edition and a \$65 per user/month fee structure for the Enterprise Edition, SugarCRM goes at almost half the price in comparison to Salesforce.com. SugarCRM is also highly customisable with modules that can be moved around with simple drag and drop actions. Since it is open source and based on PHP, SugarCRM is also a very good choice for customized implementations, since PHP is one of the most taught languages on the internet.

Considering the deployment methods, Salesforce goes for single-tenant implementation, which means everyone gets the same URL, whereas SugarCRM goes for a multi-tenant approach, where everyone gets their own URL. Due to the single tenant approach, you can never actually own the software with Salesforce. As a whole, SugarCRM takes the

all-in-one approach that is suitable for small businesses that might feel that the a-la carte mode is too expensive.

Computer Aided Design - BricsCAD

When looking for an alternative to something as powerful and design-oriented as AutoCAD by Autodesk, it would be a good idea to keep free alternatives at bay, at least initially. But don't let that make you think that this alternative is not going to be an economic advantage. In fact, BricsCAD gives you all the strengths of AutoCAD at almost half the price. AutoCAD is listed at \$1680, and is only listed with resellers on the India website. On the



BricsCAD is half the price for AutoCAD like capabilities

other hand, the best version of BricsCAD, the BricsCAD platinum is for ₹48,000.

Along with all the standard CAD functions, BricsCAD Platinum comes with full LISP, VBA, BRX and .NET support. It also comes with Electrical and Sheet metal design support, that is lacking in the AutoCAD suite. Even though some features are lacking in the BricsCAD, it supports reading 13 file types compared to AutoCAD's 8 file types. BricsCAD also has a solid support structure and also comes with an All-In addition that grants you priority support and full access to the next release.

Compared to AutoCAD's 6GB hard-disk space, BricsCAD takes only 1GB space and requires only 1GB RAM compared to AutoCAD's 4GB requirement. It has highly positive feedback regarding the launch time. According to the developer, it supports 'hundreds of third party applications'. The learning curve is only steep on the document management system but it is not entirely impossible. d

worldview

OUR PICK OF THE BEST TECH ARTICLES FROM AROUND THE GLOBE

(MUST READS)



INSIDE BLUE ORIGIN

Jeff Bezos' Blue Origin is known for its secretive behavior and recently, when it opened its gates for the first-ever tour at the company's headquarter, it was evident that the company is making big strides in rocket development.

<http://dgit.in/BOTour>

THE DRONE RACING LEAGUE

If competitive video gaming can be a professional sport generating millions a year, so why not drone racing? Drone racing has amassed passionate fans around the world and these entrepreneurs now want to make it a mainstream sport to make it a serious business.

<http://dgit.in/DrRcLg>

WHATSAPP'S END-TO-END ENCRYPTION

After being in a debate over privacy and security in the digital age, WhatsApp working along with cryptographer Moxie Marlinspike has added end-to-end encryption to every form of communication on its service. Here's all you need to know about it.

<http://dgit.in/WAEncryptd>

KEEPING IT CLEAN

It is a difficult task to keep the internet clean and only continuous content moderation will ensure that the internet platforms stay clean. Here's how the top tech companies ensure removal of offensive material from their platforms.

<http://dgit.in/CntMdrn>

[TheNextWeb Corner]

CHAT BOTS: FAD OR FUTURE?



The sudden and tremendous increase in the number of chat bots that can do anything from ordering a pizza or booking a cab, owing to the A.I. and machine learning, is it the time to say that chat bots are the next big thing in technology? <http://dgit.in/ChtBtFF>



The 4-inch phone saga

When Sony released its range of Xperia Z5s, no one seemed that excited about, unlike the response that Apple iPhone SE and mini versions of Samsung flagships receive. Will this sudden shift down help these giants to get more consumers? Seeing the price, we don't think so.

<http://dgit.in/4inPhone>



Forget your password

Passwords are becoming less and less reliable and multi-factor authentication has been around, but not accepted by each and every platform on the internet. Something more secure that has been developed in the labs is out now to reshape the future of user authentication.

<http://dgit.in/AuthSecure>



Before the IoT revolution begins

Much has already been spoken about IoT and the transformation it is going to bring in one's lifestyle in the near future. But are we truly ready for it? Here is the answer to various key fundamental questions that need to be addressed before we enter the IoT revolution.

<http://dgit.in/IoTRvlttn>

MAN WITHOUT A SOUL?

Day by day as technology is advancing, answering this question is becoming even more difficult and the fact is that they might be a part of us sooner than we think. But, what kind of world would that be and as robots grow in numbers and sophistication, what is this world becoming?
<http://dgit.in/RoboMn>

THE VIDEOGAME INDUSTRY HISTORY

Higashiyama, the place where all the major Japanese video game companies developed almost all their games and where you could play any game that was created in there, is now gone. Here's the story of how Japan's video game industry slowly faded away leading to complete demolition.
<http://dgit.in/VdoGmDm>

KINDLE'S EVOLUTION

So much has changed since the first edition of e-reader Kindle was launched, in 2007. On the launch on Kindle Oasis, hold on as we take you down the nostalgic lane of all eight versions of the Amazon Kindle ever released.
<http://dgit.in/KindleEvo>

SOCIAL MEDIA-SAVVY ISIS

38 items per day – 20-minute videos, full-length documentaries, photo-essays, audio clips, pamphlets, all of them in several regional as well as international languages. This is the what ISIS' social media accounts analysis reveals. Here's how they are effectively using social media as a tool.
<http://dgit.in/socMdlISIS>

SHORTS

Tech startups we can't wait to see in real life

These highly innovative startups are solving some very real problems using technology and we just can't wait for them to become mainstream!



– By Adamya Sharma



already managed to gather \$1,919,948 on Kickstarter to initiate their manufacturing process.

How does it work?

The OLO 3D printer can house a smartphone inside. It will then use the light from the screen of your smartphone to harden a special Photopolymeric Resin, (material used for 3D printing) layer by layer to create the final object. Images for printing can be sourced

a castable resin that can be fused to create objects in Silver and Gold or other casting metals. Neat, isn't it?

Codeybot: New Robot Who Teaches Coding, Dances & Entertains

Robots are no longer the future. They are already lending a huge helping hand to the manufacturing industry in the world and now, they are at the brink of becoming a household name. Codeybot is one such robot designed to help children become future ready by learn coding with some fun. With a goal of \$100,000, this fun-loving yet educational bot is also listed on Kickstarter for crowdfunding.

How it works?

Codeybot is an educational robot who teaches basic programming through an array of interactive features. Children have an option of coding Codeybot's LED display,

The world of technology never ceases to amaze. With startups pushing the boundaries of innovation, we will soon see a burst of new products and devices that will help us solve daily problems and make our lifestyles smarter. Here's a look at some really out-of-the-box tech startups, that promise us a bright technological future.

OLO - The First Ever Smartphone 3D Printer

Imagine if you could print 3D objects using just your smartphone. OLO, currently a Kickstarter crowdfunding project is attempting to make this a reality. Infact, the startup has

from anywhere on the internet or OLO's own library. There's also an option of 3D printing images captured by your smartphone's camera. Olo has different resins for different jobs and if wanted, it can print both hard and flexible objects. It even has



FUTURE OF GAMING



Razer, as a brand is not new to any gamerati and their future plans consist

of expanding their lineup with the addition of gaming laptops, a streaming device, and even a VR headset! Here's Razer's CEO Min-Liang Tan revealing the details in this Q&A.
<http://dgit.in/RzerCEOInt>

SUCCESSFUL TUMBLR TEENS



How important a URL can be for any user on Tumblr, only

these teens can tell you. Here's how these sixteen-year-olds marketed their Tumblrs to reach at the top, ditching their blogs and even gaining anonymity.
<http://dgit.in/TmblrTeen>

STEPS TO FLY A DRONE



Your birthday is near and you ask for a drone and

you even get it! Now, the main question arises, how the heck do you fly it? Overcoming several challenges and undergoing several emotional phases, here's how a rookie uncovered the joy of flying a drone.
<http://dgit.in/FlyADrone>

BEFORE CYBER LAWS EXISTED



Several stories of curious hackers before the birth of the modern internet

keep floating on the internet. One of the several such untold stories is of this teen hacker who transformed the early internet but also ended up becoming the most loathed man on the internet.
<http://dgit.in/B4CyberLw>

or programming a route, dance or adventure for him. The bot can also be a source of entertainment and encourages connectivity through his wifi music speakers, dancing capabilities, and a special battle mode. Way better than having your children sit in front of a TV all day!

Clairy: The Natural Air Purifier

Deteriorating air quality is a big concern for those of us who live in polluted metros and



industrial cities. Now, there are a bunch of air purifiers available in the market, but none like Clairy - the natural air purifier. Clairy is a startup and a noble one at that. Until now Clairy's founders have seen immense success in gathering funds for their goal of €89,200. Wait till you find out how it works.

How it works?

Clairy makes the idea of bulky plastic air purifiers redundant by using plants as Bio-filters. Roots and soil of the plant generate colonies of microorganisms that trap and filter the toxic agents in the air in a natural way. So, all you'll need to do is get a plant or two for your house instead of making space for ugly-looking purifier machines. Designed in Italy, Clairy is a dual-part ceramic flowerpot. Inside the larger flowerpot, a technology unit combined with a fan directs the air from inside your home

to the roots of the plant to be detoxified and eventually released.

Oombrella - unforgettable umbrella

Umbrellas are one of the most commonly forgotten accessories, but what if your umbrella was smart enough to remind you to pick it up? Introducing Oombrella, the smart, connected umbrella. Even though the idea behind this startup is simple, it solves one



of the most commonly experienced problem using technology.

How it works?

Oombrella can not only send you notifications on your smartphone that remind you to pick it up, it also give you rain alerts thanks to the temperature, pressure, humidity and light sensors that are integrated into the handle. Furthermore, Oombrella is also UV resistant and windproof! If only you could hide a katana inside it!

Fontus - The Self Filling Water Bottles

Fontus is another startup looking to solve one of the most basic problems in life - filling a water bottle. If you are on a hike or a picnic, what do you do when your bottle runs out of water? Most of us look for the nearest shop to buy a bottle or a public dispenser to get a refill.


Not these guys. These folks over in Irvine, USA decided to create water out of thin air. Literally.

How it works?

The Fontus water bottle is a device designed to capture the moisture contained in the air, condense it and store it as safe drinking water. A small fan resting in the bottle draws the air from the surrounding environment, runs it through a special filter and presses it into the condensation chamber. After that, a series of



small coolers bring the moisture contained in the air to condense on special surfaces. The resultant liquid water then drops into the bottle's main body and is stored for use. The lower section of the bottle is designed to carry little capsules, which when dissolved in the harvested water, initiate a process of re-mineralization. This process makes it possible to produce fresh mineral water and give your body everything it needs to replenish the lost energy and nutrients! Thirsty anyone?

We can't wait to check out these cool and highly innovative products. Let us know what you think of this list. If you are a tech startup don't shy away from writing in and sharing your journey with us. There are literally unnumberable possibilities out there, and who knows, your product might end up as the next big revolution that we and this planet are in dire need of! 

<http://dgit.in/TechS0416>

COLINFURZE

Claimed as “The best channel on YouTube” by themselves, this channel features various crazy inventions along with



world record attempts and videos that are a constant disregard to health and safety by this plumber, stuntman, inventor, filmmaker and a gadget geek.

<http://dgit.in/Colinfurze>



To get all these links in one easy to read page, make sure you blip this page from your smartphone.

(PRODUCT LAUNCHES)

HP SPECTRE 13



HP's new Spectre 13 is just 10.4 mm thick, weighing 1.1 kg, making it the world's thinnest notebook. Powered by Core i5 processor, it packs in a 13.3-inch Full HD Gorilla Glass screen, a 9.45 hour battery life and 8GB RAM. Price: \$1170

CREO MARK 1



CREO has unveiled its Mark 1 with a promise of regular updates to their Fuel OS. Other specifications include a 5.5-inch QHD display, MediaTek Helio X10 processor with 3GB of RAM, 32GB storage and a 21MP camera. Price: ₹19,999

KINDLE OASIS



The Kindle Oasis comes with a 6-inch display with a resolution of 300 PPI and uses 10 LEDs for the built-in light. It is said to have months of combined battery life and has bundled a leather charging cover as well. Price: ₹23,999 (Only Wi-Fi)

PICTURE PUZZLE



ABSOLUTE
TIMEPASS

UNJUMBLE ON YOUR MOBILE



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BLIPPAR APP

FILL SCREEN
WITH IMAGE

BLIPP IMAGE
INTO LIFE!

Top 3 YouTube Picks

Make sure your boss doesn't catch you goofing off with one of these videos playing on your screen



Virtual 3D teleportation

Duration: 04.46

Microsoft's holo-portation can capture, compress, transmit and reconstruct 3D visuals virtually, using HoloLens. <http://dgit.in/HoloPortn>



Analog Mechanical keyboard

Duration: 03.28

Wooting one is one of a kind mechanical keyboard that comes with analog input for precise controls for gamers. <http://dgit.in/Wtng1>



Flyboard Air Test

Duration: 02.24

Suspected to be fake earlier, Flyboard is powered by six engines, a logic board and a backpack full of kerosene. <http://dgit.in/FlyBrd>



FB launches bot for
Messenger
[http://dgit.in/
FBBotMSGR](http://dgit.in/FBBotMSGR)

> code / creativity / community >
devworx >

BASH it in

>>With the arrival of BASH on Windows being announced by Microsoft last month, here's all you need to know about why this is so exciting!!> by Arnab Mukherjee

Last month, at the BUILD conference, Microsoft announced that Windows will now support "Bash on Ubuntu on Windows" as a developer tool for Windows 10. This support extends to the Ubuntu user-space and Linux/GNU utilities, including the apt-get package manager that can be implemented by developers to harness other tools like Ruby, emacs etc from Canonical's official directories. And this development has been received overwhelmingly well by developers. But why?

What is Bash?

Bash is a shell, or command language, interpreter for the GNU operating system. Not many of us know, but the name is an acronym that expands to "Bourne-Again SHell", which is a pun on Stephen Bourne, the author of a previous version of the current Unix shell sh. Bash has good compatibility with sh and ksh and the C shell csh. It actually offers functional improvements over sh for both interactive and programming use.



The announcement that has both excited and baffled developers

Why is this so wonderful?

Microsoft hasn't exactly been at the forefront when it comes to Open Source Software. In fact, for years Apple has attracted developers

*Coding Matters



*"Scorpion" Linux OS hits testing channels

>> Q4OS 2.1, based on Debian GNU/Linux "Stretch" available on testing channels according to Q4OS team
<http://dgit.in/Q4OS2dot1>



*MediaTek announces RTOS platform

>>LinkIt Development Platform for RTOS and Hardware KIT announced by Mediatek
<http://dgit.in/MTekRTOS>



*FB tweaks algorithm to kill clickbait

>>Time spent viewing and page post diversity factor in to make newsfeed more relevant
<http://dgit.in/FBTweak>

to develop for OS X with this one card - a strong, native UNIX shell that is not based on any modification or emulation. On the other hand, Windows has been remarkably bad with developers on many points. For example, it was only in 2015 that Node finally got full fledged Windows support and that still is quite a mess, as can be seen on numerous complaints on online forums and Github. With the arrival of Bash on Windows, this is one of the many problems to be solved.

When it comes to web hosting, Linux is the leader with massive popularity, with over 68% of public websites being hosted from Linux based servers. With its efforts increasing everyday to establish itself as a credible cloud technology provider, it is only natural that Microsoft wants to push into the popularity that Linux based hosting has. Bringing native Bash support to Windows might be the card that Microsoft is playing for this purpose, with the increasing possibility of developers wanting to program on Windows due to the appeal of Bash - who knows, they might end up developing in Microsoft's own languages along the way.

Let us make one thing clear - this isn't a virtual machine, a container, or Linux software specifically compiled for Windows. With this extension, Windows 10 gets a Linux subsystem on Windows, which does remind one of the abandoned Project Astoria for making Android Apps work on Windows. For those of you who are familiar with Wine, this is somewhat like an exact opposite of that. While Wine allowed running Windows applications directly on Linux, this Linux subsystem will allow you to run Linux applications on Windows.

Actually, this is technically not Linux at all. Linux is the underlying operating system kernel, and that is not present here. Microsoft and Canonical have worked together to bring a full Ubuntu-based Bash shell that runs on the subsystem. What this subsystem does is, it allows you to run the Bash shell and the same binaries that you run on Ubuntu Linux. You may have heard the argument that the average Linux system should be called GNU/Linux because of the volume of GNU utilities and software running on the Linux kernel. What you get here with the Bash shell are those GNU utilities and software.

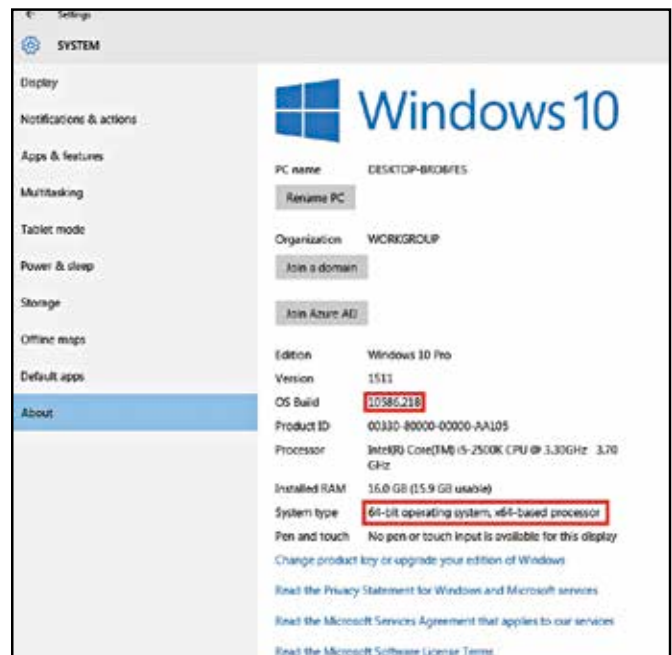
Not all of it is hunky-dory though. There are certain limitations that this implementation has. As of now, it can only deal with command line utilities. So, no server software and no graphical software. Also, even though it has access to the Windows file system, Bash commands cannot be used to automate Windows applications, and the Windows command line cannot launch Bash commands. And since it is in beta, expect some command line functions to not work.

Note- There has been a reported issue of Bash processes and applications not showing up in the Windows Task Manager or Resource monitor, even though the process can go up to using 100% of the CPU. This obviously has dire implications, as this makes Bash-enabled Windows systems the perfect targets for Bitcoin miners and Malware. This issue has been confirmed by the BashOnWindows team and is expected to be fixed by the next release.

How to get Bash on Windows

One of the first things that you need to make sure of is that the build number for Windows 10 on your system is 14316 or higher. There are two quick steps to check that :-

- On Windows 10, click or tap the **Start** button and then **Settings**.
- Navigate to **System->About** and scroll down to see the Version and Build Number fields.



In the settings app, you can see the Build number and version of your Windows installation

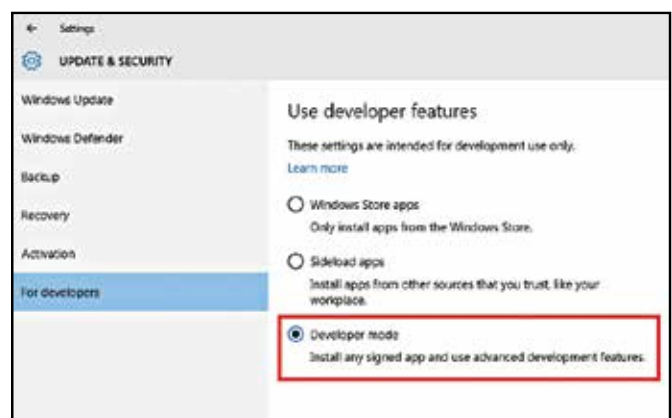
If your build number is lower than 14316, you will have to update Windows on your system before you can proceed. Once you have made sure that the build is up to date, now you need to ensure that you are part of the Insider Preview program and the same is enabled on your system. Microsoft is launching this support officially with the Anniversary build, and to try it before that, Insider Preview builds need to be enabled on your system. If it's not already enabled, here's how you can get it done - <http://dgit.in/WIPBuilds>

Also, if you are on a 32-bit version of Windows 10, now would be the time to switch to 64-bit, as this new tool works only on the 64-bit versions of Windows 10. Here's a quick how-to on getting that done - <http://dgit.in/Win3264>

Once you are sure that all the above requirements are met and you are on a correct version of Windows, follow these steps -

Step 1:

Click the **Start** button, go to the **Settings** app and navigate to **Update & Security->For Developers**. Here, tap the **"Developer Mode"** switch to turn on developer mode.



This allows you to install any signed app and advanced development features.

Step 2:

Go to **Control Panel** from the **Start** menu and click “**Programs**”. Here, click “**Turn Windows features on or off**” under **Programs and Features**. In the list pop-up that you can see now, enable the “**Windows subsystem for Linux (beta)**” option and click **Ok**. When you see the prompt to restart your computer, click “**Restart Now**” and as the system reboots, you should be able to see the installation of the new feature.

Step 3:

After the restart, open the **Start** menu, type “**bash**” and press Enter. Since this will be the first time you run the file “**bash.exe**”, you will be prompted to accept the terms of service. After you agree to it by entering “**y**” at the prompt, the application will download the “**Bash on Ubuntu on Windows**” application from the Windows store.

With that, you are all set to start using Ubuntu's Bash shell on Windows.

Using Ubuntu's Bash shell and installing Linux software

Now you have at your disposal a full command line Bash shell based on Ubuntu. Don't forget that they are the same binaries, so you can actually use the **apt-get** command from Ubuntu to install software from Ubuntu's repositories. All Linux command line software is now accessible to you, although don't expect everything to run bug free and smoothly on the beta releases. To use the Bash shell, go to **Start** and type **bash** or **Ubuntu**, which will show you the Bash on Ubuntu on Windows application. To keep it handy, you can even pin this to your Start menu, taskbar or create a desktop shortcut.

This shell is actually a root shell, so there is no requirement to use “**sudo**”. For those not familiar, the “**root**” user on UNIX is similar to the Administrator on Windows, in terms of system access. The Windows file system can be accessed at **/mnt/c**.

You might have been used to the Windows command prompt and its commands, or perhaps you are familiar with the Linux terminal commands. You will surely find the below table useful regardless

Windows command	Bash Command
cd or chdir	cd
dir	ls
move and rename	mv
copy	cp
del or erase	rm
mkdir	mkdir
edit	vi or nano

*pointers

>>Interesting developer news



*Bash for Beginners

>>A very useful playlist for learning the basics of Bash scripting before you get started with Bash on Windows

<http://dgit.in/BashforB>



*Machine Learning

>>After the much talked about AlphaGo vs Lee Seedol match, Google launches series of videos presenting machine learning recipes.

<http://dgit.in/GoogML>



*Chromium OS for Raspberry Pi Reaches 0.5

>>Multiple cores used, better audio support, performance improvements. Here's how to install it

<http://dgit.in/ChrmRPi>



*A New Morning

>>VR Startup Magic Leap releases demo showcasing Mixed Reality in everyday life

<http://dgit.in/MLNewMorn>



Always keep in mind that the Linux environment, unlike Windows, is case sensitive. So calling for “**App.exe**” is different from calling for “**app.exe**”.

As we mentioned earlier, you will need to use the **apt-get** command to install and update applications in the Ubuntu environment. Let us get you started with some of the commands that you will need.

Command	Purpose
apt-get update	Download updated information about available packages
apt-get install packagename	Install an application package (replace “packagename” with package's name)
apt-get remove packagename	Uninstall an application package (replace “packagename” with package's name)
apt-cache search word	Search for available packages (Replace “word” with a keyword that you want to search package names and descriptions with)
apt-get upgrade	Download and Install the latest version of your installed packages

Once you install a particular application, all you need to do to run it is type its name in the prompt and press Enter. Although there might be exceptions, for which we would advise you to check the documentation of the application.

Even though you are now using Bash in Windows, always keep in mind that the Windows Command Prompt and Bash are two different environments. The software you install in the Bash shell is restricted to the Bash shell and cannot be accessed elsewhere. Also, you cannot call Windows applications from the Bash shell, even though you may have access to the same files here as the Windows environment.

Microsoft will launch this feature officially with the anniversary update to Windows 10. Even though we have explained how you can use it before that, if you do actually chose to go for it, check any associated documentation properly before you proceed. The feature is still in Beta and we would not recommend trying this out on your primary/work machine. Although if you have a machine or a system to experiment on, share your experience with us >



>>Gyanesh Sharma, AVP - Engineering, Shopclues shares his insights on the changing ecommerce scenario and the challenges faced by Indian e-tailers>>

Building an ecommerce store to cater to the myriad needs of the diverse Indian population can be quite a demanding task. Moreover, the ever-increasing competition in the segment requires innovative changes to be made. Gyanesh Sharma, AVP - Engineering at Shopclues tells us how they tackle the everyday issues of an upcoming ecommerce company while planning for the future.

Mithun: As there are plenty of easy-to-deploy ecommerce CMSs in the market, quite a few being open source, has it become easy for new entrants in the market to gain a footing without much investment into a back-end team?

Gyanesh: Yes, the availability of easy-to-deploy e-commerce CMSs in the market has certainly made it easier for new entrants to gain a footing in the market. This happens in every industry and is a common phenomenon for those exposed to business. Once a domain opens up, newer entrants are able to do business without as much investment in the back-end as the pioneers. Either the technology becomes open source or the availability of talent in that domain gets amplified with time. However, this doesn't mean that newer players have an edge over those who entered the market first. The latter always has the first mover advantage and newer entrants will have to

go the extra mile to make their presence felt. Easier availability of technology and tools is only one aspect of the game.

Mithun: What are the key technological challenges for an ecommerce platform? Does the Indian market add any new parameters that well developed countries don't have to worry about?

Gyanesh: The key tech challenges for an e-commerce platform are scale, data and automation. Scale is pivotal in handling the rapidly increasing traffic in a vibrant and growing market. Data is imperative to understand consumer behaviour and accordingly make the right decisions and champion appropriate innovations. Automation is important to bring efficiency and speed to operations, another very vital aspect for committed growth.

These challenges are mostly universal. However, the Indian market is certainly different the US or Europe in the sense that the average transaction size is way lower. This is why Indian e-commerce players need to bring in greater efficiency and complete accuracy in operations to be profitable. This translates into very lean business models and extreme frugality across all departments. This is where innovation comes in as one needs to know exactly how to be effective while remaining lean.



Mithun: Would you endorse an app-only-marketplace strategy for any ecommerce platform that deals with physical goods in the current market?

Gyanesh: No, we at ShopClues wouldn't endorse an app-only-marketplace strategy for an Indian player at this stage. There is no denying that a large percentage of Indian consumers now access the internet from their smartphones. However, the desktop is also here to stay and so is the web experience. A lot of high-spending consumers in metros still prefer to use the desktop while make big ticket purchases. Additionally, most users will only keep a certain number of apps on their phones due to limitations of memory and usage. So if they don't choose to download the app, you're missing out on the opportunity to serve them via other platforms. Therefore, both desktop and mobile websites are an important part of e-commerce strategy along with apps, and both need to coexist successfully.

Mithun: When it comes to building a recommendation engine, does ShopClues mine user browsing data limited to ShopClues or are tracking cookies used to gain a deeper insight into the user's browsing habit across third party sites?

Gyanesh: We only use data mined from ShopClues user browsing history. As a company, we take customer privacy very seriously. Tracking cookies to gain a deeper insight into a user's browsing history is strictly against our policy. We plan to continue being extremely careful about the kind of customer data we access.

Mithun: Also, should we expect to see a new payment gateway from ShopClues?

Gyanesh: There are a lot of companies doing payment gateway, and some of them are really good. We don't have an ego problem that we must create everything that we use. If someone is doing a particular technology well, we would rather partner with them and keep our focus on the core business.

Therefore, creating a payment gateway is not a priority for ShopClues. However, we are in the process of releasing an innovative product for sellers. Payment will be one of the critical features of this product. This new product aligns well with our strategy of having a deep focus on sellers. We see them as an important part of our business success and this product will make it easier for them to sell through our platform and grow their business with us.

Mithun: Often, e-commerce platforms focus a lot on enhancing customer experience towards purchases but the grievance redressal mechanisms are often cryptic and hard to access. Will ShopClues go down the same road or do you plan on taking the road less travelled?

Gyanesh: At ShopClues, customer experience and retention have been equally important parts of our strategy from the word go. We have always focussed on grievance redressal as much as we have laid emphasis on customer acquisition and we intend to keep improving our post purchase experience. As a matter of fact, we have better repeat purchase frequency for the complaining customer cohort. Moreover, we are taking up projects specifically focussing on improving post purchase experience and delighting the customer continuously even after the purchase has been successfully completed. >

SAVE SPACE ON SMARTPHONE



Stream your Music & Movies

These days almost everyone who owns a smartphone has some access to an active internet connection. With the space constraint on mid-range phones, streaming music and movies seems to be an obvious solution. Choose from a number of streaming applications like Wynk, Saavn, Gaana and save your smartphone's storage.



Sort your Reading List

If you are an avid reader and have purchased a host of ebooks off multiple online ebook stores, you really shouldn't keep all of them downloaded on your smartphone. Your purchased ebooks are not going anywhere, and you can read one book at a time anyways! So download them when you read them, and keep the rest safely online.



Delete Unused apps and games

There are some games, where you would have given up trying to cross a level, or probably have finished the entire game itself. And when it comes to apps, the ease of installing new ones often leads to a lot of unwanted apps occupying memory that we just forgot to uninstall. These apps and games often occupy large amounts of space on your phone without you even noticing it. It is best to locate and remove these on a regular basis to free up space.

Steps to find out storage eating applications on Android and iOS.

• iOS

Settings > General > Usage > Manage Storage

• Android

Go to your device's Settings app



Save space on smartphone	27
Remix OS	29
Steam	32

Tips & Tricks has its own page numbers, and does not follow the rest of the magazine's page numbers. This is done to ensure that you can cut out and save T&T in a separate folder for later reference.

> Select Apps or Application manager.

Touch the app you want to uninstall > You may need to swipe right or left to find the app.

> Touch Uninstall or Disable.



Use more curation apps

These days we use multiple apps with the same purpose from multiple providers, like booking a cab for instance. So why not keep one aggregator app on your smartphone that can club many apps like Uber, Ola? For this particular issue, we

can use ixigo which will help you book the cheapest cab which is possible near your location offer by UBER and OLA and multiple cabs providing services.



Shrink your Photo Size

We all love clicking pictures but these pictures take up a lot of space on our phones. Picture quality is not a prominent factor if you don't have to print those pictures. Change the resolution settings on your camera to a preferred value

Steps to Downsize your pictures.

• iOS

Shrink My Pictures is a paid app for Rs.60 which will allow you to batch resize your images and then you can later transfer the original to cloud or to delete them.

• Android

Most of the Android phone have a option of changing the picture resolution in the camera settings so you can actually reduce the resolution before clicking pictures that you don't intend to print.



For common apps, use the web

Apps like 9GAG, Wikipedia, Facebook are often redundant, when you can access it through your browser. Many even have lite versions available. Keeping apps which can be browsed through your phone might not be that wise. So deleting those apps or switching to a lite version can help you save storage.



Clean your cache regularly

Smartphone slowed down even when you didn't install anything new? On that note, have you noticed how a restored iPhone or a factory reset Android is faster than the regularly used smartphone? This is because your smartphone's is full with application data saved over time by the processor. If not cleared, a nearly full cache can slow down your phone a lot, so clean your cache regularly and make your smartphone's performance faster while saving storage space.

Steps to clean cache on iOS

- Tap Settings < General < Storage & iCloud Usage.
- Tap Manage Storage.
- Tap an item in Documents and Data.
- Slide unwanted items to the left and tap Delete.



Android clearly shows the amount of space taken by apps



You can even check the iCloud storage on iOS

- Tap Edit < Delete All to remove all the app's data.

Steps to clean cache on Android

Go to Settings and tap on Application Manager/Apps. < Tap on the desired app < Tap on clear cache.



Off-load data to your PC/ Laptop regularly

One of the simplest ways to save storage space on your smartphone is to regularly backup your photos and videos to your computer. That way, not only can you delete those on your smartphone to save space, you can also retrieve them if something happens to your phone.



Use Cloud Storage

You can also use a number of cloud storage services like Google Drive, OneDrive, Dropbox which will provide you with enough storage to shift your pictures and videos and free up storage space on your smartphone. Some of them can actually perform auto-backups and inform you what can be deleted from your system. For example, Google Photos.



Factory Reset/ Restore your smartphone

Sometimes starting afresh can be the best option so why not restore your smartphone and

bring it back to its out-of-box speed and smoothness? Here are the steps to restore your smartphone.

Steps to Restore your iPhone.

1. Open iTunes on your Mac or PC.
2. Connect your smartphone, iPad, or iPod to your computer with the cable that came with your device.
3. If a message asks for your device passcode or to Trust This Computer, follow the onscreen steps. If you forgot your passcode, get help.
4. Select your smartphone, iPad, or iPod when it appears in iTunes.
5. In the Summary panel, click Restore [device].
6. Click Restore again to confirm. Then iTunes erases

your device and installs the latest iOS or iPod software.

7. In iTunes, click Restore again to confirm.

After your device restores to factory settings, it restarts. Now you can set it up as new.

Steps to Factory Reset your Android

1. If your phone is on, turn it off.
2. Press and hold the Volume up button and the Power button at the same time until the device turns on.
3. Press the Volume down button to select "Recovery mode."
4. If you need to navigate to the "Recovery mode" option, use the Volume up button to move the arrow and the Volume down button to select it.
5. You'll see an image of an Android robot with a red exclamation mark and the words "No command."
6. While holding down the Power button, press the Volume up button and release it.
7. Use the volume buttons to scroll to "wipe data/factory reset" and press the Power button to select it.
8. Scroll down to "Yes - erase all user data" and press the Power button to select it.



Toggle the "Keep Normal Photo" to off



Or Switch to a 32GB/64GB variant

With the kind and volume of content these days, 8 to 16GB space doesn't cut it. An iPhone user can buy a new phone with 64GB or 128GB and if you are an Android user you should go for an upgrade with decent internal storage and SD card support.

iPhone specific-



Tweak your HDR

We all love clicking pictures iPhone's has been known to have amazing options like HDR. It is definitely a beautiful mode. So, if you prefer pictures clicked with HDR mode then you don't need to have normal pictures anymore. Follow the steps below to keep only the HDR pictures and save space.

Steps to Tweak your HDR

Click on 'Settings' < Click on 'Photos & Camera' < Uncheck 'Keep Normal Photos'.



Record Video at lower fps and resolution.

Most people don't have a 4K display at home. So just because your iPhone gives you the option to shoot 4K videos doesn't mean that you should. The iPhone offers an option to choose which quality of video to record. To strike a balance between file size and video quality follow these steps

Steps to choose quality of recorded video.

Click on 'Settings' < Click on 'Photos & Camera' < Click on 'Record Video' under Camera Section < Choose '720p HD at 30 fps'

Android specific-

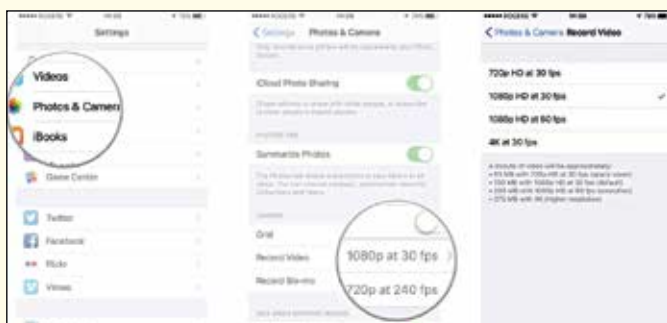


Install a Custom ROM

If your phone is rooted and you know what you are doing then switch to a custom ROM



With things like 4K video, even iPhones can't spare much space



Chose the video setting balancing space and quality



Link2SD required root permissions, which might void warranty

and get rid of bloatwares. This will increase the available space, further making it more usable

You can get many step to step guides online for your specific smartphone.

Note-Rooting may void your warranty.



Install Link2SD or AppMgr III

Before we begin - Link2SD works only on rooted Android phones. This app creates a link to your SD card in such a manner that the phone believes it to be part of internal storage and allows you to store apps onto it. If your phone is not rooted try shifting your apps to SD card using AppMgr III this

might solve your issue of low phone storage. Do remember that removing the SD card will probably cause some apps to not work.

REMIX OS

The Android operating system was first and foremost designed for mobile devices such as smartphones and tablets. Google later



Cyanogenmod is a popular choice for a Custom ROM

developed versions optimized for other smart platforms such as TVs and watches. However, finding a version of Android optimized for the PC platform was still a challenging task, owing primarily to the inherent difference in UX design: desktops and (for the most part) laptops are mouse/keyboard-driven and rely on a UX that allows for seamless multi-tasking, something that most Android PC emulators lacked.

Remix OS set out to tick all these boxes and is arguably the first to market in terms of a PC-based Android operating system. It provides a very intuitive, almost Windows-esque user interface coupled with lightning-fast performance. With support for multiple resizable windows and a familiar file explorer design, Remix OS is looking to bridge the gap between mobile and desktop applications. In addition, the devices, for which the OS is designed to run, are not restrained by power consumption or heat dissipation issues, which has resulted in performance benchmarks that cannot be matched by any standalone Android device on the market today.

In essence, you can think of any laptop or PC running Remix OS as a very high-end Android tablet with PC peripherals such as a mouse and keyboard for more intuitive input. Couple this with the portability offered by its method of installation and Remix OS is open to a number of cool use cases, some of which we will list out ahead.



Get All the Apps!

Remix OS comes in a bare-bones package, i.e., the only apps it comes preinstalled with include a custom file browser (similar to windows explorer), an internet browser, a calculator, a clock, and media apps for music and video.

To install additional apps, you have three basic methods:

(A) Websites such as **apk-mirror.com**, which host apk files

Started by AndroidPolice.com, apkmirror.com hosts the apk files for almost all free apps available on Google Play. It also host older versions of apks, which you can download and install in case a recent app update caused something in the app to break. Apkmirror provides an ideal solution for those who wish to install minimal apps while avoiding the hassle of installing Google Play Services (see Method C)

(B) Alternate app repositories like **Amazon app store and F-Droid**

Not many Android users are aware of alternate app stores and repositories aside from Google Play. For example, Amazon's app store offers a number of free and paid apps, many of which are also available on Google Play. Amazon, however, occasionally offers great deals on paid apps, often offering them for free as ways to promote their App Store. To use the Amazon app store, simply download the apk from their website (www.amazon.com/getappstore) and install.

F-Droid is another great example of a free app repository (available as an installable apk). F-Droid offers a catalog of free and open-source apps, many of which are not available on the Play Store. What also sets it apart is the amazing community behind F-Droid and the fact that all apps hosted on F-Droid are required to be both free and open-source. This means the code is often audited by other developers and F-Droid curators, making the apps available on it safe and at times more secure than those available on Google Play.



REMIX OS INSTALLATION FOR BEGINNERS

Use Remix OS to give your mom's old laptop a new facelift

There are two methods by which you can install and run Remix OS (See Step 3 of the installation process). For a portable version, you can install the OS on a USB drive (16 GB and above and USB 3.0 recommended). This way, you can run your OS on any PC by booting from the USB drive and get access to all your stored files and apps. Alternatively, you could run Remix OS as a secondary (or even primary) OS on your existing PC. This is especially useful if you want to breathe life into an old laptop that is on its last legs. The steps for installing Remix OS are outlined below:

Step 1: Download the version of Remix OS compatible with your BIOS and system (32-bit vs 64-bit) from the following link:

<http://dgit.in/RemixOSDwnld>

[TIP: To know which version to download, go to Run, type in `msinfo32.exe` and check System Type and BIOS mode.]

Step 2: Unzip the contents of the RAR file and run the Remix OS installation tool.

Step 3: In the installation tool, select the destination drive: either a USB drive for the portable version or any existing drive on your PC. For the ISO file, select the ISO extracted from the RAR. Click OK to begin the installation.

Step 4: After the OS has been successfully installed, reboot your system, and when the boot menu appear, select Remix OS and proceed.*

**In the case of a Legacy BIOS install on a USB drive, you may need to [A] manually go to the boot menu by hitting the boot menu key after POST (check your motherboard manual for this) or [B] change the boot menu preferences in the BIOS setting by selecting USB as the priority device over the hard drive.*

(C) Google Play Services

Easily the most extensive method, getting access to the Google Play Store ensures that all apps under your Google account are automatically downloaded and updated, just as on any other Android device. However, Remix OS does not come with Google Play preinstalled. Fortunately, some of the good guys over at the xda-developers forum have devised an easy fix:

1. Visit the following link on the browser and download the GMSInstaller.apk file: <http://forum.xda-developers.com/remix/remix-os/app-install-google-play-services-remix-t3292087>.
2. Install the apk and run the app.
3. Click on "One-click to install Google Services" and wait

for Google Play Services to download.

4. GotoSettings -> Applications -> Manage Applications -> All
5. Clear all data for the apps "Google Play Services" and "Google Service Framework" and reboot the device.
6. Open the browser and search for "Google Play Services". Click on the Play Store link and update the app from the Play Store (You will have to login to your Google account).
7. You are now set to download all you favorite apps.



Make a DIY Game-Streaming Hub

Let's say you own a beast of a PC for gaming but you're also the type who enjoys gaming on

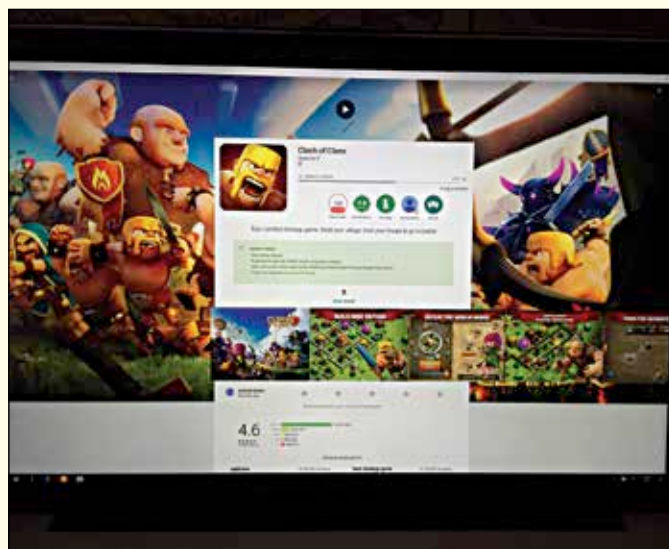
the couch with a big screen TV. Now unless you own a console, you're best bet is to connect your rig to the TV via an HDMI cable. And unless your PC is placed in the same room as your TV, you have little option but to lug the rig across your house with the risk of it catching a few bumps and scratches (***shudder***).

Fortunately, the advances in development of streaming media technology means there are now several methods to stream games on PC to your TV or any other device connected to a network. Streaming to Android devices has been made extremely easy thanks to the Moonlight Game Streaming app (previously known as Limelight).

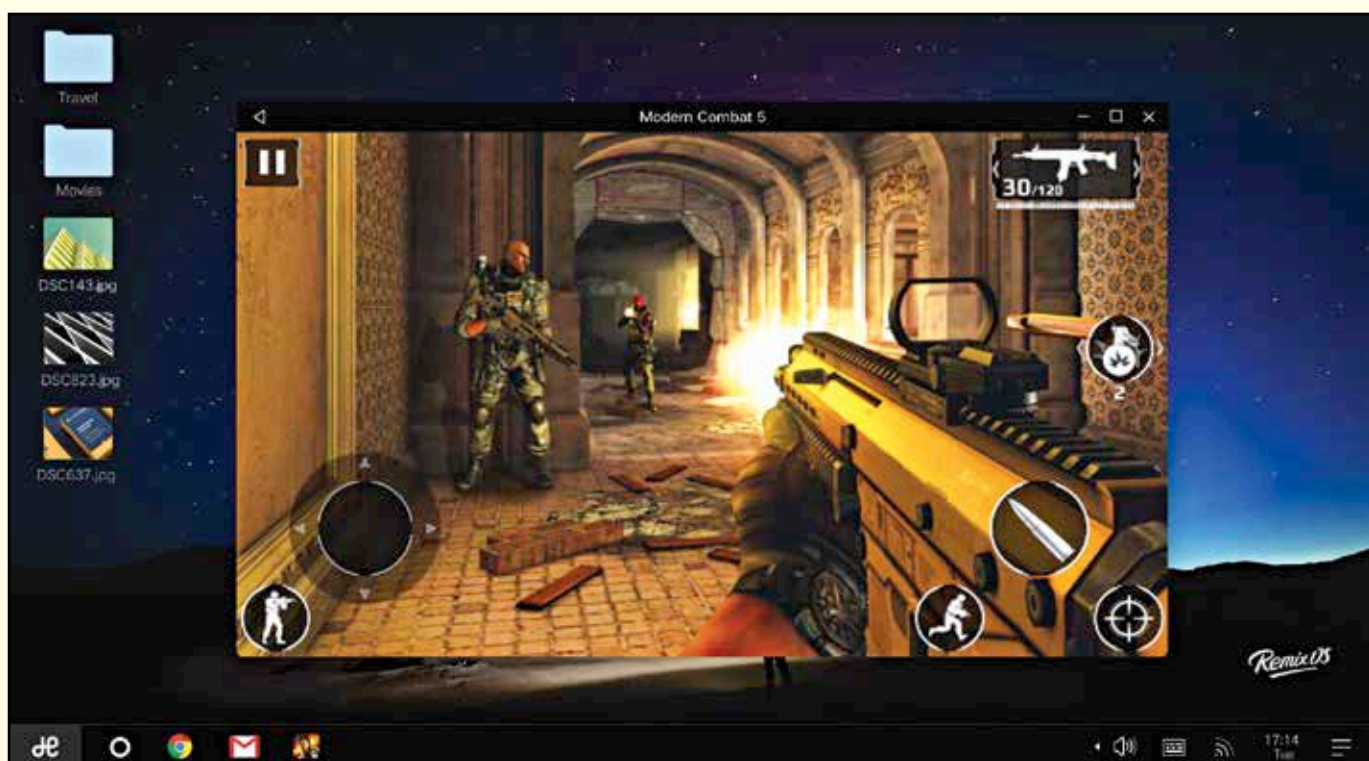
The app is based on NVIDIA's GameStream protocol. This was developed by NVIDIA for streaming games over high-speed networks to its Shield tablets, which were designed to give gamers a portable yet high-end gaming experience. The Moonlight app is compatible with a number of Android devices and, with the help of Remix OS, can be used to convert an aging laptop into a portable gaming rig, as outlined in the following steps: (Note that Moonlight only works if you have a PC with an NVIDIA graphics card).

- A. Ensure you have the latest NVIDIA drivers as well as the GeForce experience application installed on your PC.
- B. Install the latest version of the Moonlight game streaming app on your Remix OS laptop.
- C. Start the Moonlight app on your Remix OS laptop and pair your PC with the laptop using the on-screen instructions.
- D. Once the devices are successfully paired, you should be able to view your game collection in the Moonlight app. You can stream your game of choice on your laptop.
- E. (Optional) Connect the laptop to your TV via HDMI and use the TV as a primary display for the complete console experience

Some points to keep in mind are that you will require a very stable WiFi connection, preferably using a high-end Wireless N or AC router. Also, it is advisable to use the Xbox or PlayStation gamepads as these controllers require no additional setup to work with Moonlight. It also supports standard Bluetooth controllers. Using an external mouse and keyboard requires the root-only version of Moonlight and a few additional set-



The only reason to install Google Play Services



Remix OS running Modern Combat 5

ting tweaks (Google is your friend here).

Convert an Old laptop to an Android Gaming Console

AMD graphic card users might feel left out, but game streaming is not the only way you can get a console-like experience from your Remix OS device. Over the past five or so years, Mobile gaming has gone leaps and bounds in terms of game design and technical polish. Games like Dead Trigger, The Room, and Real Racing are testament to the fact that mobile games can look and play like a triple-A console/PC title.

Remix OS provides the perfect opportunity to play such high-end mobile games on a larger, more immersive display like that of your PC or your TV. The possibilities are even greater once you realize that Android has emulators for old-school consoles like the Sega Genesis and SNES and popular handheld gaming devices like

the Game Boy Advance and DS. Here is a list of popular emulators available for download:

- A. SNES - Snes9x EX+
- B. Sega Genesis - GENPlus-Droid
- C. Game Boy Color - My OldBoy!
- D. Game Boy Advance - My Boy!
- E. Nintendo DS - DraStic
- F. PlayStation One - ePSXe for Android
- G. PlayStation Portable - PPSSPP

Downloading the emulator is just one half of the solution. The SNES, Genesis, and Game Boy emulators will require the

ROMs, which you can download from www.emuparadise.me. For the PS1 and PSP emulators, you will require an ISO copy of the original game since these games are harder to find (and possibly illegal to distribute freely).

Create a dedicated media player

Streaming media is the latest trend taking over the internet space. While YouTube may have opened the floodgates, services like Netflix and Hulu have properly capitalized on the

whole cordcutter phenomenon by providing a convenient way to watch your favorite movies and TV shows on demand.

The easiest way to convert your Remix OS device into a media player is by downloading the Android apps for these services and hooking up the device to an HDTV. Those who want to put in additional efforts should also consider setting up a media server on their PC with a service like Plex.

Plex explained

We're all too familiar with the hassle of copy-pasting media from one device to another. You're smack-dab in the middle of the last season of Breaking Bad but someone else needs to use the PC for "urgent work". Now you're forced to either wait out till your PC is free or copy the media on to a portable drive or smartphone so you can continue watching it on another device.

Now imagine having the content stored on one device but with the ability to access it



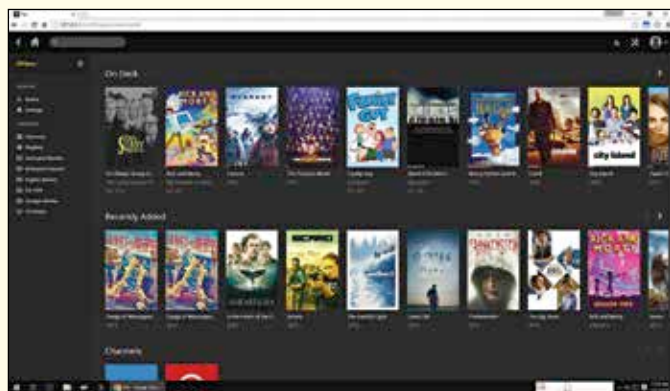
An app like Edjing can transform your Remix OS device into a professional turntable for mixing audio tracks



from any device anywhere. Plex provides a seamless way for you to stream media across all your devices with the convenience of a visually appealing and intuitive user interface. Plex also tracks your viewing, so if you leave a movie halfway, Plex will remember your position and

your media content on your PC. Go through the steps for basic setup as per the on-screen instructions.

Important: Before the next step, ensure your media collection is separated in distinct folders; i.e., movies, TV shows, music, photos, and personal



Example of a properly set up Plex server

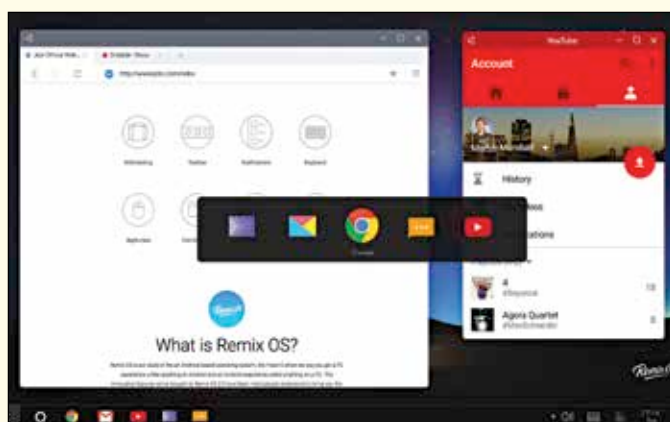
will resume the movie from there regardless of which device you choose to view it from. However, the best part of Plex is the ease by which you can set up your own media server.

Setting up a Plex Server

- Create a Plex account on https://plex.tv/users/sign_up
- Download the Plex Media Server application for your operating system from the following link (<https://plex.tv/downloads#pms-desktop>)
- Install PMS and run it. You should see a web-based interface. This is used to manage and also view all

videos should each have their own folder (subfolder do not matter). This is important to help Plex manage your media library.

- In the Organize Your Media step, you should see an Add Library button. Click on this and select Movies. Now go to the path where your Movies folder is located, select the folder and click on ADD LIBRARY. You can repeat this step to add other libraries like TV shows and photos. Then click on NEXT.
- You can also add Plex channels to view curated content from networks like Comedy



Quickly switch between application windows with Alt+Tab

Central and Pitchfork TV and websites like SoundCloud and Vimeo. You can skip this step for now. Click on NEXT.

- Set up in now complete. Plex will automatically scan for media files in your libraries and create entries for them along with metadata downloaded from the internet. You can view your media by clicking on Home and selecting your library from the left side menu. All the content in the library should show up on the right side.

How this ties in with Remix OS

- To view your Plex media on your Remix OS device, first download the Plex for Android app from Google Play.
- Login to your Plex account from the app. Once login is successful, ensure your Remix OS device is connected to the same network (wired or wireless) as your Plex media server.
- You should now be able to connect to the media server as created in the previous section. Now select any content (movie or TV show) and click on play. Note that Plex requires a one-time in-app purchase of about 300 in order to stream content on the same Android device.
- Hook up your laptop to a big-screen TV for the complete home theatre experience.

tings, turning the touchpad on or off, and taking a screenshot among others.

- Multitasking shortcuts are also supported. For example, Alt+Tab allows you to switch between active windows. Ctrl+Space lets you switch between input languages. Double-tapping the Ctrl button activates the app search function.
- Remix OS also supports standard text-editing shortcuts such as Ctrl+A (select all), Ctrl+C (copy), Ctrl+V (paste), Ctrl+Z (undo), Ctrl+Y (redo), Ctrl+B (bold), Ctrl+I (italic), and Ctrl+U (underline). You could probably discover a few more yourself.
- Remix OS has ported standard browsing shortcuts to make the experience of web surfing similar to that on a traditional PC. For example, Ctrl+T opens a new tab, Ctrl+W closes the active one, and Ctrl+[number] toggles the active tab to the that of the corresponding number. Similarly, in the email app, Ctrl+N opens the message compose screen and Ctrl+F opens the search bar.

STEAM

Almost all of us who game on the PC are familiar with Valve's Steam software. It's the gateway to PC gaming heaven, for all the uninitiated. However, apart from just downloading



Save time with easy-to-use shortcuts

Remix OS supports a variety of keyboard shortcuts to help you multitask like a pro.

- If you're running Remix OS on a laptop, try using the shortcuts found on the function keys. These included adjusting volume and brightness, opening set-

games and playing them, did you know that Steam's hiding a few tricks up its sleeve? Here are some nifty little tips that you need to try on your next Steam session.

Download a game while playing another

Waiting for game downloads can be a pain especially when the game is 40GB in size and we all know the whole point of having games is to kill time so why not do both the things simultaneously? Just follow the steps and get out of this trouble.

Steps to Follow

Steam > Settings > Download > Click on 'Allow downloads during game play'.

Update your driver using Steam

We all know searching for your graphics driver over the internet is such a pain and when Steam allows you to update them why not do it? Even though video graphic drivers are an important part of your gaming setup so Steam gives us the benefit of updating it with just one click.

Steps to Follow

Steam > 'Click on Video Driver Update'.

Download games from your phone

Sometimes when you are out and want a game downloaded on PC automatically, you can use Steam's mobile app for Android or iPhone and remotely download your game on your computer easing your life that when you reach home the game's download is finished.

Steps to Follow

Download the Steam app for your Mobile > Go to your Library and Start the Download.

Batch game management

With a long list of games, managing them individually can mess up with your patience very quickly so why not choose

all games at once and do batch game management, just follow these steps and apply actions to the number of games you want.

Steps to Follow

Library > {Detail view} and Ctrl-click every game. Now right-click one of the selected files to perform a batch action.

Check your FPS

We all installed third party apps like Fraps when we wanted FPS overlay in our games but with Steam we have an inbuilt feature of FPS overlay. Just follow the steps and you will have it in your game play helping you to find the perfect graphic settings.

Steps to Follow

Steam > Settings > In-game > Click on 'In-game FPS counter' > Select your desired display location.

Create Game Backups

We are very aware of the fact that games take up a lot of space and it's a huge trouble when we have to have to add, change or remove our hard disk. One way out is a full backup software but here Steam allows you to use its own feature of backup and restore games.

Steps to Follow

1. From the Steam menu, select Backup and Restore games.
2. Select "Backup currently installed programs."
3. Select the games you want to backup from the list. > Click Next.
4. Select a destination for the backup. > Click Next.
5. Give the backup a name. > Click Next.

Listen to music using Steam

Steam's music player allow you to add MP3 music to your local library and play it both inside



SteamGuard also has additional features to protect your account



Steam can display FPS data on screen with this option



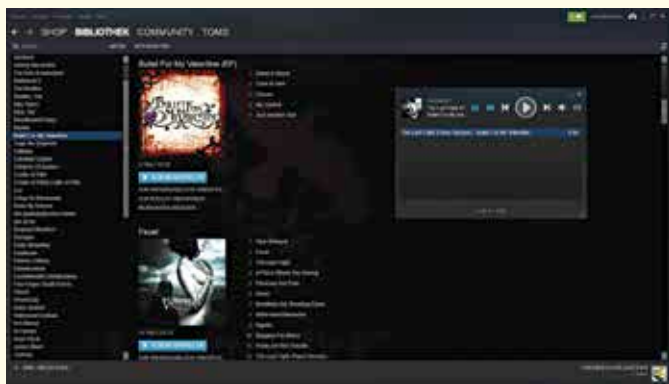
There is only one Duke.. unless you have him backed up!

and outside a game in Big picture mode and even on the desktop interface. This works in Steam on Windows, Mac, Linux, and Steam OS. So why not make the most of this feature?

Steps to Follow

Steam > Settings > Music > Click on 'Add' to add your music folder.

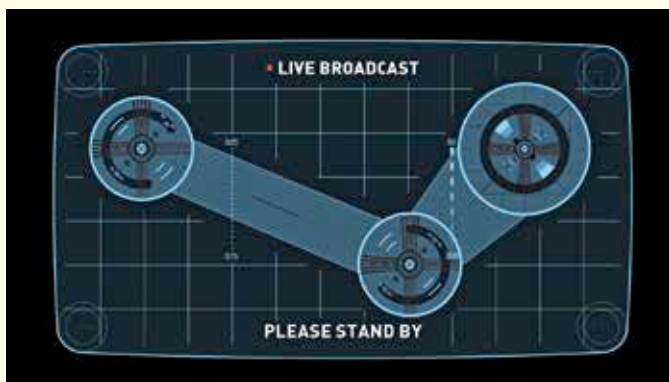
View > Music Player > Click on the icon which looks like 'Six



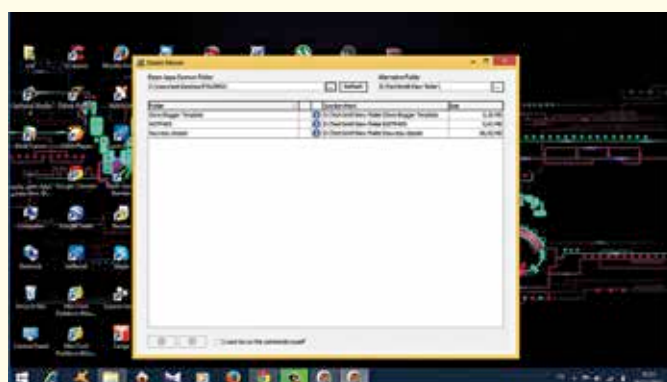
Your game - your tunes



Share your games without losing out on individual achievements



Now share your gaming glory live with your friends



Move your Steam games elsewhere on your HDD

Dots' and play your desired album.



Hide games in your library

After you finish playing a game mostly it is just lying in your library. There is a chance that your library looks badly cluttered. Use Steam's Hide games option to hide the old games from your library and give your library a clean look?

Steps to Follow

Go to Steam library > right-click on the game you want to hide

> Select Set Categories > Check the box which says 'Hide this game in your library'.



Broadcast your gameplay with friends

'YouTube' is quickly becoming a good destination for online live game streaming these days. With an inbuilt broadcast feature in Steam, you can display your gameplay to your friends or anyone.

Steps to Follow

Steam > Settings > Account >

Choose 'Beta Participation'.
Steam > Settings > Broadcasting
> Choose your appropriate settings.



Share your Game Library

We have been sharing console game with our siblings since long and when it comes to Steam you can still do that with the help of this feature ,

Steps to Follow

First make sure your SteamGuard is active.

Steam > Settings > Account.
Settings > Family (or in Big Picture mode, Settings > Family Library Sharing), where you'll also authorize specific computers and users to share.



Choose Your Download Servers in Steam

At the time of a new game launch or sale, there is too much traffic for game download and this can totally kill your excite-

ment. With a few steps you can change your server to one with the least traffic. To find the appropriate server navigate to this website '<http://store.steam-powered.com/stats/content/>' to find out a line graph detailing Steam's bandwidth over the past 48 hours.

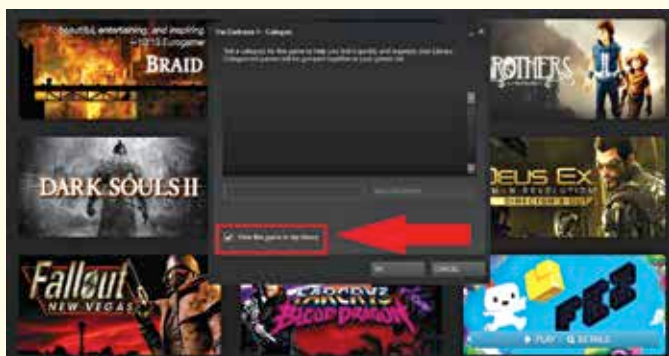
Then just change to a server with less traffic by navigating as below

Steam > Settings > Downloads > Change your 'Download Region'.



Move Game to another HDD without Re-downloading

With the help of third party software like Steam Mover, you can move an installed game to another location on your system directory. This software creates a junction point in the Steam directory, making it appears to Steam that the game is still located in the Steam folder.



Hide unwanted games in the library to keep your gameslist clean.

IMAGING: ANIL T.

THE 'PERFECT' RACE

A RACE IS ON TO DEVELOP GENETICALLY ENGINEERED SUPER
HUMANS WHO WILL BE SMARTER AND STRONGER THAN US.
BUT WILL THEY STILL BE "HUMAN"?

INDEX:
HUMAN 2.0...Pg. 82
NATURALLY SELECTED...Pg. 85
LESSONS FROM FICTION...Pg. 86

HUMAN 2.0

THE EVOLUTION OF OUR SPECIES MIGHT, FOR THE VERY FIRST TIME, BE DONE ON PURPOSE

BY ROBERT SOVEREIGN-SMITH

It's one thing to genetically engineer crops, or sheep, or earthworms... but doing it to humans opens up a whole new floodgate. There's really no black or white, clear right and clear wrong in such cases, which is why this is such dangerous territory that we're treading.

It's like wading through a nuclear minefield, and every step we take gives us added confidence of our safety and righteousness, but we're still just one step away from annihilating the world as we know it.

Before we delve into this month's cover story, however, we should tell you that this isn't going to be a medical scientist's take, or be filled with medical jargon – mostly because we're not qualified to talk about complex genetic engineering, and don't even fully understand how it's done... but also because “What can we do?” is not the important question, whereas “What should we do?” is.

CHINESE EMBRYOS

The genetics world was shocked when Chinese scientists at Sun Yat-sen University in Guangzhou, announced that they had successfully engineered human embryos to modify a gene that we think is responsible for thalassaemia – a fatal disease that causes improper production of haemoglobin, and eventually death.

The scientists claimed that they had not taken viable embryos, and thus, this was not a violation of globally accepted

ethics regarding cloning, genetics and the like. They used embryos sourced from IVF clinics that would otherwise be destroyed because they were “non-viable” – these were eggs that had been fertilised by 2 sperm, and thus could never result in a baby anyway.

Much like you do in a word processor, they were able to cut and paste genetic code – using a technique called CRISPR/Cas9 to remove the bad genetic code and add in new code. The results were not

always good, because sometimes the wrong codes were getting cut out and replaced, which basically means a very genetically deformed embryo, but that's just a question of honing their skills, because they also did get it right.

Let's be clear, they are not claiming that they have cured thalassemia; they're saying they could, in theory, make sure that if two people want to reproduce, they can make sure their baby will not have thalassemia. Of course, this can only be perfected by allowing embryos to grow and form humans in order to investigate the results, and thankfully the world has outlawed that as of now.

CRISPR?

Clustered regularly-interspaced short palindromic repeats (CRISPR) is a defense system used by bacteria to protect themselves against viruses. Viruses infect cells by injecting their DNA into them, and bacteria protect themselves by producing short RNA strands, which have a sequence that matches the virus DNA in question. Cas9 is a protein nucleus that is capable of breaking down and editing DNA. The bacteria sends out the RNA strands with, amongst others, the Cas9 protein (Cas = CRISPR-associated). This then finds the viral dna, bonds the bacteria-created RNA to the viral dna, and this causes it to mutate, or die out because it isn't able to replicate. Controlling this method is what is used to edit dna of everything from simple viruses to humans.

DESIGNER BABIES

If genetic editing is the spark, then our human flaws are the fuel. It's one thing to find a cure for a disease, and totally another to try and engineer flaws out of people. What will start off as trying to cure diseases will end up with people wanting to design their offspring. It's a natural and logical progression, isn't it? It will start with rich people wanting to make sure that they have healthy kids, and then move on to someone willing to pay even more to ensure that they get a child with the muscular attributes of, say, Usain Bolt. Some might want a kid that looks like, say, Alia Bhatt, but has the intellect of Einstein – wouldn't that be weird?

India is a prime example of how cultural selection itself leads people to

do inhuman things. Although the killing of girl children may horrify our Digit family of readers, it's certainly not horrific enough to a very large part of India, because it still happens even in 2016!

If people don't think twice about ending a life, what makes us think they will have morality to not try and design babies? In a few decades we might find all rich kids looking like the film actors of today, and most of them are going to be male – because that's what Indian designer babies would probably be.

MAN'S BEST FRIEND

Most people in favour of genetic engineering will point out the man's best friend argument. Dogs are nothing more than genetically engineered wolves that humans bred into submission about 40,000 years ago. Humans and wolves would have been in direct competition during the ice age, and humans were probably killing off wolves that were confrontational, and allowing those that were more submissive to feast on the remains that humans left behind. It's assumed that humans might kill the ferocious adult wolves, but adopt orphaned wolf cubs.

By getting the tamer wolves used to eating cooked food, and breeding and keeping dogs, we achieved a massive feat of genetic engineering the wildness out of wolves, and created the dog species, of which there are so many variants now. However, taming dogs is one thing, what if someone wanted to breed a race of tame humans who would automatically be submissive to, say, white people... would we be as gung-ho about that idea as we are about dogs?

WHAT ABOUT CURES?

Ah, the double-edged blade that is medicine! Surely we can't be advocating that parents who have kids who are suffering from horrific diseases just shut up and bear it, and not be given an option to save their babies, right?

No, we're saying that editing of DNA itself is just the entrance of the rabbit hole. Scientists are sure to dive down the rabbit hole the first chance they get, because that's just what scientific curiosity is. If you could play god, you'd want to know what you could do, and test your skills in various ways. You're less likely



Domestic dogs, wild dogs and wolves all descended from a common ancestor

to sit back and think about the consequences of your actions in the long run.

Thus, in the short term you might save a life, but what about the long term consequences?

LIFE AND DEATH

It's a cycle, and for a reason. We live, we die. Imagine if you were born and never died? Maybe humans start dying at the age of 150 instead of, say, 75. That doubling of life actually means a lot to society and the world as a whole. The world has 7 billion people, and if all of them started living longer and reproducing for longer, we might double our population in no time. However, certain studies are of the opinion that the Earth can't accommodate more than 12 billion humans before all hell breaks loose. There just wouldn't be enough food to feed everyone, and faced with starvation and certain death, there's no telling what horrors 12 billion humans will inflict on one another.

STILL...

This is not to say that we should lose all humanity and allow people to die sooner for the greater good. Of course not. Neither do we want kids to die from curable

diseases. We're just asking about where the line in the sand is to be drawn when it comes to genetic engineering.

If editing DNA of living cells of suffering adults really does work, why would we not want that? For example, perhaps we could find a cure for Alzheimer's, or even Autism, which affect otherwise perfectly healthy people. A lot of neuroscience would come under this actually, and it's a valid question. Would we not want to cure Stephen Hawking of his Lou Gehrig's disease?

Of course we do, but what's next? Curing Robert of his baldness? Maybe Siddharth wants to be taller, Jayesh wants to be slimmer or Mithun wants to be prettier? Yes we're poking fun at ourselves, but the fact remains, there's always going to be people who want to modify themselves in some way in order to feel good about themselves, and it doesn't necessarily work – Michael Jackson was a prime example.

THE 'PERFECT' RACE

Now we get to the reason for our rather stark and evil-looking cover. It's not normal to want to take a baby and make it look like one of the most despised men in history... We did this because we believe

that genetic engineering is at a very important stage. Before this, we could at best clone a human, and that too not very well. However, technology has been improving all the time, and now we're on the verge of understanding how DNA



Alana Saarinen has 99% of her DNA from her parents, and 1% from a mitochondrial donor. Read the full story on the BBC site: <http://bbc.in/1qiuRGa>

works, and have started building tools that will let us edit the very coded information that makes us human. It's now that the people of the world will take the call to decide what's OK, and what isn't.

As of 2015, we've seen a few dozen genetically modified humans been born and grown up, and all from a two-year experiment in the US aimed at helping women conceive.

Some women have a problem with mitochondria in their eggs which causes them to be unable to conceive. What some scientists did was take mitochondria from a healthy woman's eggs and insert it into the other's, and then fertilise the eggs with the father's sperm, and the resulting fertilised eggs were the first ever humans with DNA from three different humans!

Not only is this a method to help women conceive, it's also a way to prevent those with markers for mitochondrial diseases from passing this on to their kids. Some of the most common mitochondrial diseases we know of are autism spectrum disorders, diabetes and thyroid problems.

Although the studies were banned in about two years in the US, that was enough for between 20 to 30 kids to be born using the method, and technically, have three "parents" in terms of DNA.

Since then, UK has made it legal after much public consultation and

speaking to experts, and is currently in the process of working out licensing structures in order to prevent misuse. Again, we should specify that this isn't designer babies in the making, because there's no controlling of traits other than preventing mitochondrial diseases – it's not like they're asking for only blonde-haired, blue-eyed kids! However, we do have to wonder what's next?

FOOD

Genetically modified food has been around for some time now, and like everything else that's controversial, there are two very obstinate and argumentative sides, and neither is willing to relent.

The naturalists will have you believe that we need to live naturally, and we need to go on vegan diets, or paleo diets, or whatever is the fad of the month, and they certainly don't want you to have anything that's even sprayed with pesticides... genetically engineered plants are just a clear no-no for them. Now there are plenty of arguments about why such people distrust anything remotely scientific, and our

medicine, and not be selective and run to get cancer treatment when death comes knocking for them or their loved ones.

The other camp is no better, to be honest, and they're often thought to be the big pharma and Monsanto apologists. Often accused of being on the payroll of big corporations, these people are very vocal about opposing the naturalists. Of course, because they're a more educated and scientifically-literate lot, they seem to make more sense. However, arrogance and turning a blind eye to all questioning is not wise either. Now we're not suggesting, for example, that there's any truth to the whole anti-vaxxer propaganda, or suggesting that vaccines be discontinued or anything like that. There's enough and more information to show that vaccines are safe. However, when it comes to genetics, it's still a new field, and thus it's not like we know for sure that there's no long term benefits. Claiming that is, in fact, very unscientific – yet that's exactly what many claim.

There is, however, one truth that we cannot hide from; when it comes down to it, the world will soon not be capable of feeding itself using natural methods. Thus, purely for the future of the human race, genetic engineering is needed. For plants



Greater than 90 per cent of the corn growing in the US is genetically modified to withstand pests and diseases

own guess is that they're also quite likely to be the anti-vaccine types, but we're sure that the world cannot sustain an all natural way of living – not when 7 billion humans bustling for space is the most unnatural thing around. If you come across such people, ask them to live truly natural, and shun all technology and

and animals, however. Until we know more, or have mastered genetic engineering for lower level life forms, we have no business meddling with human genetics.

What we're doing is akin to taking the best paper airplane designers in the world, and asking them to design fighter jets... it's just a little too soon for that...

NATURALLY SELECTED

A CONTRARIAN VIEW BY AGENT001

BY AGENT001

As usual, I'm going to take the unpopular stance here – but not just because it's unpopular. First things first, since we've gone ahead and associated genetically engineered humans with Hitler, I want to be clear I'm not supporting eugenics. I'm merely saying that we should let the laws of natural selection take their course.

For those who don't know, eugenics is the philosophy of encouraging breeding of people with desirable traits, and suppressing the reproduction, or even sterilising people with perceived negative genetic traits.

An example of this would be encouraging the world's scientists to have more kids, and forbidding hardened criminals from reproducing (perhaps even sterilising them). This is not something any sane person would support. However, before you exhale with a sigh of relief and think that all is well in the world again, you should know that this is in fact happening all the time. A simple example is the economic system the world runs on, which automatically gives kids in developed countries a better chance of not just survival, but also success in life. Poorer countries (third world countries), have more kids, and less success, and high mortality rates.

We may have become more civilised, but the 'survival of the fittest' attitude of the world hasn't yet changed; and I doubt it ever will. Humans are a competitive race, and that's not going to change – not

until a change so drastic happens that today's humans wouldn't consider that future version to be the same species.

EVOLUTION

When we talk about evolution, it's not something "random" or "by chance". Almost all natural selection is by design (not intelligent design, but because of selfish genes). Changes in weather, in surroundings, and even human interference – dogs, for instance, have evolved relatively quickly from wolves to live alongside humans.

Today, humans are living longer and reproducing till later, and that's thanks to the advances in medicine and hygiene. Are we evolving? Yes, of course we are, and we're being naturally selected based on a number of factors, and those factors

depend on where we live, how much we earn, etc. Natural selection is such a complex process, is defined by so many various parameters and is so inevitable, that I dare say it's terribly disingenuous and narcissistic to think that we can ever have any role in opposing it. Mother nature is not a force mere humans can ever hope to totally control – we can't really create or end storms, but merely better our chances of surviving one.

It's in this sense that I'm all for genetics and exploring avenues to better the quality of people's lives. Why should a parent ever suffer helplessly while their child lies in hospital, or a family lose a parent to diabetes or cancer. If genetic engineering can help us create a better us, what's wrong with that? Aren't we essentially doing the same thing already anyway?



India has been declared polio free since 2014 because of some good work done by the government in communicating the need to vaccinate

What is medicine, if not an attempt to try and cheat nature. Chemotherapy, organ transplants, stem cell research, etc., are really just us playing “god” by trying to cheat death. We’re searching for the fountain of youth, and why not? Is there something wrong with people not wanting to die, or not wanting to suffer while they live?

MISUSE

Of course there is scope for misuse, and we will point to the rich and cry foul because, undoubtedly some rich person is going to pay to get his babies designed. It’s not like he or she isn’t already doing that. Already many rich people are able to travel the globe to access services such as sex-detection in countries abroad (since it’s illegal in India).

Through IVF they are able to select the best embryo candidates and screen out

embryos with markers for genetic abnormalities. Of course this isn’t a sure-shot solution, and it’s also not really “designer babies” (yet). In the US you can legally get IVF treatment and select whether you want to have a boy or a girl, along with screening out eggs that have the genetic markers for diseases – I guess we can all agree that it’s certainly unnatural, and definitely somewhat “designed” reproduction.

The cost for such IVF treatment at large and reputed clinics starts at \$25,000 and goes up to much, much more based on what you’re asking for. It’s rumoured that many rich people from across the globe, and especially celebrities use such facilities to ensure that they have “perfect families”.

The rich are always going to get a better class of options and care, but does this mean that because the rich might get perfect families, the poor shouldn’t get

life-saving genetic treatment? That’s like cutting off your nose to spite your face.

I think it’s time we stop being so upset by everything and realise that mother nature is like a casino – it may appear to lose a few hands and a few will get away with a few winnings, but in the end the house always wins, and casinos always make more money than they pay out.

It’s best we let nature decide who and what survives in the long run, and just get on with improving technology, our understanding of biology and extending the quality of our lives.

The one concession I do have to make, however, is admitting that the world would be a very boring place if everyone was genetically perfect and similar. I don’t want to hear the kind of music I’d make up, I want some mad genius to push the limits of music composition and wow me... for example.

LESSONS FROM FICTION

A SHORT LOOK AT HOW POPULAR FICTION HAS COVERED GENETIC ENGINEERING

BY ROBERT SOVEREIGN-SMITH

Fiction (especially science fiction), leads the way for us. It’s the best of us imagining a future, and sometimes that future is utopian, and then sometimes it’s horrifying. This is what helps us keep grounded in reality, and fiction plays an important role in us charting our way forward.

Here’s a look at some popular takes on genetic engineering and eugenics in fiction, in order to help us imagine what our world could be like. We’ll leave it to you to

make up your mind about whether genetic engineered humans are a good or bad idea. Remember to send your feedback to editor@digit.in because we really want to know whether you’re pro genetic engineering or against it.

2001: A SPACE ODYSSEY

Arthur C Clarke’s magnificent story is one that scratches the surface of what would later go on to become the idea of transhumanism. Being able to transcend all the drawbacks of being human, David Bowman is converted by alien technology

to an immortal intelligence that is able to transcend both space and time, yet remains as a protector of Earth. The story also reveals an interesting idea about how mankind evolved from apes. Read the book (or the whole *Odyssey* series), we prefer it to the movie.

RESIDENT EVIL

Although not really being genetically engineered in the positive direction, this game (and later movie franchise) explores how the typical evil corporation (Umbrella Corp) uses a genetically modified virus to

change people into controllable zombies, and how further genetic engineering can produce super-zombies.

STAR WARS

When the backstory of the clones from the Star Wars franchise was finally told in *Attack of the Clones*, we're told that the Kamino Cloners have used not just cloning, but also genetic engineering to enhance the clones to accelerate their growth rate and make them better and more obedient soldiers.

RINGWORLD

In Larry Niven's excellent *Ringworld* series, there is a character called Teela Brown who is descended from "lucky" ancestors. In the fictional world, lucky people win the birthright lottery, and are allowed to breed, and she is the result of six generations of consecutive winners, thus making her the luckiest person alive. This side story about her treats even how lucky people are as a genetic trait.

STAR TREK

Although there are many species that feature some form of genetic engineering in *Star Trek* (the various series and movies), Khan Noonien Singh (best known as just Khan), is a genetically modified human (or Augmented Human) who has been bred to be stronger, have more stamina and a higher intellect. However, whilst augmenting all these characteristics, what also gets amplified is his ambition, and he seeks to take over the universe and establish an augmented human race. (Sound familiar?)

ENDER'S GAME


In this excellent book series by Orson Scott Card, Ender Wiggin is a third child (a third is strictly frowned upon as one child too many in that time) who is allowed to be born only because of his parent's high intelligence in the hope that he can be put to military use. In the series, it is later revealed that another character named Bean is also genetically modified as a result of humanity's desperation to win a war against alien invaders, but in Bean's case, there are some awful side effects. We won't spoil the series for those of you who haven't read it. Highly recommended. There has also been a moderately good movie adaptation.

GATTACA

The movie *Gattaca* is set in a future where the human race is genetically modified and everyone has designer babies, because perfection is the norm. Everyone is gorgeous looking and super athletic, yet some people still cling to old ways and have children the natural way. These children are labeled invalids, and aren't given the same treatment as the perfect humans, and are denied the job opportunities. The story is brilliant and follows the path of one such invalid as he breaks all the rules, cheats and lies and does all he has to in order to accomplish his dreams.

THE LAST QUESTION

One of the best science fiction writers of all time, Isaac Asimov was better known for his *Robot* series and the laws of robotics, but he also wrote some pretty interesting short stories. One of our favourites is *The Last Question*, in which the entire evolution of mankind – billions of years into the future – is told beautifully as the buildup to a shock ending. It is a short story, and we encourage you to give it a read now: <http://dgit.in/LastQstn>

Write in and let us know if we've missed out on your favourite fictional treatment of genetic engineering. 



Workshop

Got laptop heating issues? Time to give it a good clean. Let this workshop be your guide

**Play Music Logo**

Google Play Music logo has been changed from Headphones to a Pizza like design.
<http://digit.in/Pizzalogo>

Setting up a computer lab, fiddling with Steam and a funky Windows 7 installation

We're certain our readers aren't alone, perhaps you're plagued with these issues as well?

Future-proof gaming

Dear Team Digit, first of all, it's nice to read your magazine so keep on great work. And now I was hoping for your help with upgrading my PC's gaming performance.

My System's Configuration are:

- Motherboard - ASRock H81M-WW
- HDD - 1 TB
- RAM - 8 GB (4 GB x 2)
- Processor - Intel Core i5 - 4440 CPU
- Graphics Card - NVIDIA GTX 960 (4 GB)
- PSU - Corsair VS550 SMPS

I am thinking about future proofing and have come to the conclusion that SLI would be the way to go. What are your thoughts?

1. Is NVIDIA SLI possible with my current graphics card. If yes, what upgrade should I go for to make it possible?
2. Is there any other good way to upgrade my pc? Do let me know.
3. This upgrade must be able to keep-up with the gaming world for at least four to five years.

I really really want a powerful AAA gaming PC. So please help me.

Thanks in advance, Digit.

—Yogesh Thakur

A If you are looking for a machine that can handle all them fancy AAA games at the very highest possible settings for the next four to five years, you're going to have to spend an awful lot of money. Games are getting really huge with high resolution textures that need a lot of graphics processing power. Your current configuration does not support SLI. SLI requires 2 PCIe slots running at 8x each at the very least. So if SLI is your goal, then you need to upgrade the motherboard to one that does support SLI. This means you'll need a motherboard based on the Z97 chipset. So



Should you SLI?

that'll be around ₹12K aside from the ₹17K it's going to cost you for a second GTX 960. If you have two stock GTX 960s then your current PSU will be brought down to its knees. If you consider an overclocked graphics card, you'd need to upgrade the power supply in this case as well. Even if you were to stick to stock cards, there might arise a situation where you'd have to overclock your graphics card for some game or the other, which again would require you to upgrade your PSU. So that's another ₹6-8K of expenditure. Your Intel Core i5 should be sufficient for the next 2 or so years without worry. So let us know what your budget is so that we can offer you a better solution.

10 PCs for 1 Lakh

Hey Agent001,

This is the first time I am mailing to you and I am in a fix. My father owns a school and I had to get some cheap stick pc's for the computer lab. But unfortunately they got overheated and now all I have is a pile of crap. So would you please tell me about some server like thing to which I can connect 10 monitors and so and that works perfectly. My budget is 100,000 including the monitors and stuff. Thanks

—Yogesh

A Hey Yogesh, you certainly do have a tight budget so the best solution that we can offer you for your situation would be Zero or Thin Client solutions. These are devices which rely on one machine for storage and processing while the remaining machines are just clients with just a monitor and a mouse and keyboard. Zero Clients and Thin Clients rely on virtualisation on the server to take care of your computational needs. There are plenty of solutions that should fit right within your budget. NComputing's X550 is one such solution where each kit comes with one PCI card and 5 clients. And the software can support two such PCI cards on one computer so you can have a total of 11 machines running off of just one computer (fat client).

First you'll need a motherboard with two PCI slots, not PCIe slots, to make this work. But since you haven't mentioned your existing hardware we don't know what exactly to recommend to you. You can also use the Raspberry Pi as a thin client so that's another viable solution that you can opt for. The Raspberry Pi is comparatively more power efficient and would not require a centralised server.

Steam Offline Client

Dear Digit, I know this might not make any sense but I have a worrisome query. I know that you can install Arkham City without having to download it and install it offline without downloading it. I do not have internet in my house and this message is being sent from a cybercafe. The point is I know that you have already answered that query from another person about Call of Duty: Black Ops 2. But I've lost the book and I want to know how. Can I also get a link for an offline Steam



Nixie Watch

Nixie watch has got its first redesign after more than 10 years
<http://dgit.in/NixieW>



Kindle Oasis - Bluetooth

Kindle Oasis might come with Bluetooth support as in many devices Wifi and Bluetooth Chip come in bundles.
<http://dgit.in/BluetoothOasis>

Q&A

update installer? Thanks in advance! I'm an avid reader.

—Sidharth Bangera

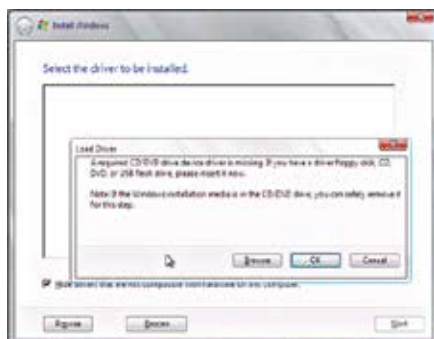
A Hey Sidharth, since you're asking about offline installation, we're assuming that you already have the DVD or have the backup files present with you. Restoring Steam games are very easy and we do it all the time when running benchmarks here at Digit. However, given the way Steam's DRM works, you'd need to be online when restoring the game. This is so that Steam can contact its servers and check whether you own a legit copy of the game or not. Without this step, the restoration process will not go ahead. So if you somehow manage to get an Internet connection for a short time, simply head over to the Menu bar > Account > Backup and Restore Games > Restore a previous backup >



Steam's DRM is tight

Navigate to the folder where you've stored your backup and then click on 'Next'. It will ask you where you wish to restore your game and all you need to do then is wait for it to get done.

As for getting an offline installer for Steam, that's something that Valve does not provide officially but there is a loophole around this. Update Steam on whichever computer you have access to the Internet. Once done, navigate to Steam's installation directory (usually C:\Program Files\Steam\) and copy the entire content except the SteamApps folder, which would normally be where all your games are installed by default but we won't touch that since we're dealing with only the client here. Now paste all of this into your offline machine and voila! You have the most recent Steam Client. However, you'll still need to authenticate the new machine at least once, which will require an Internet connection. Life without Internet sure is a painful one.



Disconnect and reconnect USB

Funky Win 7

Hi! Each time I try to format my PC with a bootable DVD or a bootable pen drive, I get this message - "A required CD/DVD drive device driver is missing. If you have a driver floppy disk, CD, DVD, or USB flash drive, please insert it now."

Note: If the Windows installation media is in the CD/DVD drive, you can safely remove it for this step."

What could be the reason behind this?

—Swagat Barkakoty

A Hey Swagat, this is a very common problem and the solution is incredibly simple as well. The moment you get this error message, simply cancel the process and backtrack to the main Installation screen. Disconnect the USB device and then reconnect it. Now proceed with the installation as normal and you shouldn't get this error message.

Hot laptop

Hi Team Digit, I am an avid fan of your work. You all are truly awesome geeks. Each month I eagerly wait for the Digit issue. I cannot express my excitement over its arrival and at first I used to drool over it before I got around to reading it. Now I am running into a problem. I have



A little cleaning helps

a Lenovo Laptop. The problem is that my hard disk usage shoots up to 100% at the time of windows booting. Also, whenever I try to do basic works like playing music, playing movies, it shoots to 100%. Also its idle temp is very high (58°C). I have tried everything but nothing has worked out so far. Please help me, tell me the cause and the cure.

—Piyush

A Hey Piyush, Performance spikes are common while starting programs, there's nothing unusual about these. Also, your temperatures seem to be a little over average. You can use The Windows Task Manager to see which process is at the top when it comes to CPU usage and see if there's anything running in the background which could be causing all of these temperature spikes. These things vary from machine to machine with each additional installed application factoring in. So you'll need to comb through Task Manager to figure out the culprit. Also, cleaning your laptop will bring down the temperatures by a bit as well. You might want to check out the Workshop section in this issue for more information on how to go about that.

Restoring backup on Mac

Dear Team Digit, I've had my current system for quite a long time and I'm thinking of switching to a Mac. Being an avid gamer, I have more than 100 GB of Steam backups on my Windows system. I wanted to know if I would be able to restore my Steam backups from my old Windows system on to Steam on my new Mac.

—Angad Itucha

A Hey Angad, first of all hats off to you for choosing Mac. Secondly, when it comes to backups, you don't need to worry about it at all since Steam backups are OS-independent. This means that you should be able to restore your game backups on any OS as long as it can run the Steam client. However, when restoring a backup made on a Windows system on to the Mac OS X, you might need to download additional Mac OS X content that would be needed in order for the game to be able run smoothly on the Mac. Be sure to check whether the games are Mac compatible first.



Dinosaurs extinction

Meteores might not be the reason for Dinosaurs extinction. Check it out.
<http://dgit.in/DinoExtinction>



Threaded Messaging

According to Slack's CEO Threaded Messaging is really important and is on its way to the market.
<http://dgit.in/ThrdMess>

HOW TO CLEAN YOUR LAPTOP

Mehul Bhagwani

feedback@digit.in

Are you fed up with the slow performance of your laptop? Is your laptop over heating so much that you're unable to work? Do you want your laptop to work the way it used to when it was brand new? It's time for you to do some laptop maintenance. Your laptop, after many months of use might be filled with dust and that dust clogs the ventilation resulting in your device overheating and showing a reduction in performance.

REQUIREMENTS:

- **Brush** - A soft strength and medium strength brush is apt for dusting components within your laptop.
- **Screwdriver set** - Your laptop might use Torx, Philips or the regular (-) screws. Get the right set of screwdrivers.
- **Blower** - Using a blower over a brush will help you save time and be reduces the chances of damage to SMT components.
- **Thermal Paste** - A new tube of thermal paste will be needed while reseating the processor, we had a Thermalright CF III lying around so it was used in the process.
- **Tissue Paper** - You need to use the tissue paper to wipe off the old thermal paste on your heatsink.
- **Acetone** - Using Acetone can help you wipe the thermal paste.

When your laptop is overheating and not performing to it's full potential it needs maintenance but what if you can do that at home without going to the service center?



STEPS 1:

Here are all the basic requirements for the job. Which are already mentioned above, we have used an HP Laptop and the process may vary depending on the model of your laptop. Make sure you wear a static band while handling the internals to avoid static discharge.



STEPS 2:

Start by referring to your laptop's manual or watch disassembly videos for your laptop to get familiar with the process. Unscrew whichever screws are mentioned by the manual and then slide the plastic covering which will allow you to open your laptop.



STEPS 3:

Remove the cable which is connecting your hard drive to your laptop as shown in the picture. Be careful and gentle with the wiring as it is very delicate in strength and try to pull the wire using the black plastic strip which is attached to the connector. It should pop out easily.



STEPS 4:

When removing the hard drive make sure you are careful. Hard drives are prone to damage from physical shock and the same can be said for every other component. But when your precious data is at stake you know it's best to be as careful as you can be.



STEPS 5:

When you want to remove your RAM the easiest way is by unlocking the clips from both sides of the module and then when the RAM pops out from its position just remove it. Your laptop might have one or two modules situated one above the other. Remove both.



STEPS 6:

Unscrew your Wireless/Bluetooth Chip and gently remove it, make sure you remove the cables marked 1 and 2 carefully and remember which cable fits on which side. Remember to reconnect them during reassembly as these are the antennae for your Wi-Fi / Bluetooth.



Microsoft's Azure
Microsoft Azure Cloud Computing Services is generally available now.
<http://dgit.in/Microsoftazure>



Pink Macbook

Apple has come up with it new Macbook which has better in performance and available in Rose gold. <http://dgit.in/MacbookPink>

Workshop



STEPS 7:

Remove all screws on board and make sure you remember the specific screws and where the exact one fits as you might end up putting the wrong screws and destroying the threads in the plastic screw slots of your laptop.



STEPS 8:

When all the screws are removed, take out the DVD drive which is attached to your laptop. In this case we have an extra hard disk attached to the laptop in the multibay slot. So just slide it gently and it should pop out.



STEPS 9:

Once you've taken out the hard drives and plastic panels you might come across more screws. Remove these as well. Be careful and don't remove screws that are not required for moving to the next step as you might cause damage.



STEPS 10:

Using any sharp plastic object like a guitar pick or plastic card and slide it in the slit between the keyboard and the chassis. The keyboard should pop out easily. You might have to slide the keyboard upwards or downwards.



STEPS 11:

Unplug your keyboard from the base. Handle the Flat Ribbon Cable (FRC) with caution, just refer to your laptop manual to find out the socket mechanism and then try to remove the FRC. Also, remove the FRC which is connected to your touchpad and power button.



STEPS 12:

Remove all the screws on board and make sure the frame is not held by any of them because if you miss even one screw and try popping the chassis, the cumulative stress on the plastic frame might just rip it straight out. So that's another thing to be careful about.



STEPS 13:

Using the plastic card start removing the plastic casing of the laptop, this will help you unhook the sockets which are holding the frame and then make sure you are not damaging any plastic component of the casing as it will not fit properly if any of it gets broken.



STEPS 14:

Once the casing is removed look for possible wires and FRC attached to the motherboard and remove them, you will possibly find one connecting your screen, connecting your USB 2.0 Hub and the charging point. Additionally, there might be other cables as well.



STEPS 15:

Remove all the screws which is holding your motherboard to the frame and gently unscrew it. After all the screws are removed gently pull the motherboard and carefully slide it to the side which will help you remove the sockets from the plastic casing.



STEPS 16:

Holding the motherboard in your hands gently blow air on the fan and make sure you are holding the fan blades gently with your finger so as to not have it rotate violently. If the accumulated dust is a little thick or tough, switch to a medium brush and dust it off.



STEPS 17:

Now disconnect the cooling fan and proceed to remove the copper heatsink. If you have a discrete GPU then the heatsink might be covering the GPU as well. Don't bend the heatsink while removing it and see if it uses thermal pads of thermal paste.



STEPS 18:

Clean the thermal paste on the heatsink with a tissue and use acetone if necessary. Apply a rice grain's equivalent of thermal paste and then reseat the heatsink. Put the screws back alternately while maintaining equal pressure. Reassemble your laptop.

Bazaar

THE LATEST PRODUCTS REVIEWED FOR YOU

The Digit Test Centre receives hundreds of products every month. Each of these products is put through a series of tests and is finally given a score. The final score is arrived at after considering a number of factors and evaluating them in terms of features, performance, value for money, build quality, and, in the case of software, even ease of use.

For better understanding of our ratings, here's a quick guide to our overall score

- 10 to 30** **Extremely poor product.**
Keep away!
- 31 to 50** **Strictly OK.**
Not recommended
- 51 to 70** **Decent product.**
Go for it, but there may be better products out there.
- 71 to 90** **Very good product.**
Highly recommended.
- 91 to 100** **Ground-breaking product.**
We've never seen anything like it before.
A definite must buy!

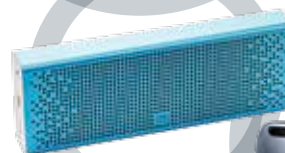
Page 95 ▶
Apple iPhone SE



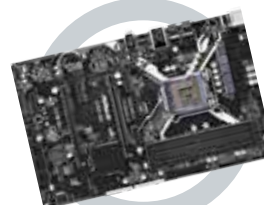
◀ Page 97
ASUS ZenBook UX303UB



Page 99 ▲
Mi Bluetooth Speaker



Page 101 ▲
Samsung Galaxy VR



▲ Page 102
ASRock E3V5 WS



▲ Page 103
Acer Predator 15

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RoboHon to go on sale

RoboHon, Sharp's phone to go on sale soon. This robot is definitely cute and adorable. <http://dgit.in/Robohonup>



Automatically Tag you on FB

Facebook wants to automatically tag you and your friends in the video. This will make the post more searchable. <http://dgit.in/FBautotag>

Bazaar

Xiaomi Mi 5

Five for Fighting

To be a best, a smartphone must have the best performance possible. If it can do that within a budget, it becomes even better.

That's exactly where the Xiaomi Mi 5 excels. The Snapdragon 820 is downclocked to 1.8 Ghz, but it can still go toe to toe against the Exynos 8890 on the Galaxy S7 Edge. Xiaomi made the right choice, going for an FHD display, which reduces the load, compared to a QHD screen, and allows better frame rates.

Further, 3GB of RAM is enough for the most resource intensive games, but 4GB would indeed have been better. The Xiaomi Mi 5 can't keep as many apps running in the background, as a Galaxy S7 Edge can. That said, for most regular users, there's enough and more RAM. The fact that the phone doesn't heat up also makes it feel better. The Xiaomi Mi 5 almost never goes above 40 degrees, and the processor barely throttles.

While the Mi 5's performance is its strength, its camera is its main weakness. The 16MP Sony IMX298 sensor just doesn't make the cut, against flagship cameras. For its price, the Mi 5 still has a respectable camera, but phones like the OnePlus 2 and Honor 7 edge past it. Even Xiaomi's own Mi 4 is a better shooter. The Mi 5's camera is really weak in low light conditions, losing out on most of the details, and doesn't do so well with colours either. While images are satisfactory under well lit conditions, in indoor conditions and lower lights, the phone just isn't the best, especially by Xiaomi standards.

Moving on, the Mi 5 is a very well built smartphone. The curves on the back, and the fact that it weighs only 129 grams, makes it very ergonomic. The only complaint with the build is that the glass on the back is slippery and the phone can slide off flat surfaces often. Overall though, it's a good looking phone that feels very premium.

The 5.5 inch FHD display is has a bluish tinge to it, but you can correct that by turning on Reading Mode and lowering the intensity. Very few would notice the blue bias though. What you will notice, is the buggy UI. Our Xiaomi Mi 5 unit can't open Google Now On Tap, and the company has said that it's working on fixing this bug. There are some other bugs as well, but Xiaomi said that final models will ship with stable MiUI 7 versions.

For all its performance, the Mi 5's battery life also takes a hit. To be clear, it's not bad battery life for a flagship device, but the Snapdragon 820's power



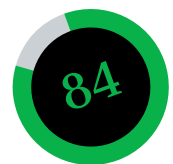
doesn't allow the 3000 mAh battery to last a full day on heavy usage. It's possible on the Redmi Note 3, which is powered by a Snapdragon 650 SoC. The Xiaomi Mi 5 will require charging twice, on heavy usage, and that's where the fast charging tech comes in. The second time, you can just charge till 40-50% to get you through the day.

It's worth noting that while the Mi 5 supports Qualcomm's Quick Charge 3.0 technology, the charger shipping with the phone will be a Quick Charge 2.0 compatible unit. It should be enough for more, but you'll have to buy a Quick Charge 3.0 compatible charger if you want to use that technology.

The difference between Quick Charge 3.0 and 2.0 lies basically in the way electricity is consumed. Smartphone batteries tend to reduce the electricity consumption as they charge, but quick charge 3.0 ensures that the battery draws just enough power needed to charge it fast. This allows less leakage and heat formation.

Overall, the Xiaomi Mi 5 is definitely a flagship class smartphone, but under a mid-ranged pricing. If you want a powerful and good looking smartphone, on a budget, this is the phone to go for. Yes, the OnePlus 2 and Honor 7 have better cameras, but the performance more than makes up for it, and the Mi 5's camera would do for those who aren't camera enthusiasts anyway. At ₹24,999, it's one of the most value for money smartphones in the market.

Prasid Banerjee



Features.....	82
Performance.....	83
Design.....	90
Value.....	72

Specifications

Display: 5.15 inch FHD;
Processor: 1.8 Ghz
Snapdragon 820 quad-core;
RAM: 3GB; **ROM:** 32GB, not
expandable; **Camera:** 16MP,
4MP Ultrapixel; **Battery:**
3000 mAh; **Operating
System:** Android 6.0
Marshmallow

Contact

Phone: 18001036286
Website: [http://www.
mi.com/in/service/online/](http://www.mi.com/in/service/online/)



Android gets better Emoji

Android to get Human-like Emoji with Android N these emoji's will represent Humans.
<http://dgit.in/AndroEmoji>



Facebook showed off VR selfies

Facebook just showed off VR selfies using a selfie stick this is an evolution from Video.
<http://dgit.in/vrselfie>

Gigabyte BRIX GB-BXBT-2807

Small, silent and toasty

Having tested one of the higher-end BRIX SKUs and also one of the lower end SKU's, we have been keeping a keen eye on these Mini-PCs. And the GB-BACE-3000 is yet another budget BRIX from Gigabyte's stables. Earlier we'd tested a similar N2807 variant in terms of the processing capabilities.

Like all Mini-PCs, this too does not come with any RAM modules or storage devices installed. Although, you can find quite a few sellers online who offer assembled kits so that you don't have to worry at all. One drawback that this particular unit has over other Mini-PCs in the same price



Price
₹10,500

segment is that it only has one RAM slot. Which causes a slight drop in performance since you don't get dual channel performance.

The device is definitely well-built, as were the others. The mounting cage for your hard drive or SSD is quite rigid and has a pretty thick layer of thermal gap filler so your storage drive won't rattle around. The GB-BACE-3000 features a fanless design so there's a meaty heatsink on the underside of the PCB which covers more than 80 per cent of the surface and there are any matte black fans out there, then you've got something forward to look to.

The closest devices in terms of performance that we've seen are the ASRock Beebox (N3150 variant) and the MSI CUBI (N3205U).

The Gigabyte GB-BACE-3000 is built to last and runs a little warm to the touch but is really silent thanks to the fanless design. Single channel memory does put it a little behind the competition but the device is priced to compensate for that.

Mithun Mobandas



Performance.....64
 Features67
 Build77

Specifications

CPU: Intel Celeron N3000 up to 2.08 GHz; **Memory support:** 1x 1333 MHz DDR4 upto 8 GB; **LAN:** Realtek Gigabit Ethernet; **Audio:** ALC255; **Display Ports:** VGA, HDMI; **I/O:** 4x USB 3.0, 3.5 mm audio I/O, MicroSD card reader; **Dimensions (LxWxD):** 56.1 mm x 107.6 mm x 114.4 mm; **Warranty:** 3 years

Contact

Gigabyte Technology (India) Pvt. Ltd.
Phone: 022-40633222,
Email: sales@gigabyte.in,
Website: www.gigabyte.in

Sennheiser Momentum 2.0

The beauty that plays



The Sennheiser Momentum 2.0 wired on-ear headphones are a pleasure to look at. Clad in premium Alcantara fabric that is usually spotted in sports cars, the Momentum 2.0 looks and feels premium right from its packaging. However, as goes with most supra-aurals, the level of comfort is somewhat compromised. Sure, the cushioning does not make it unbearable, but it remains uncomfortable for any period of listening over a maximum of 30 minutes.

The Sennheiser Momentum 2.0 isn't just a fancy looking headphone to gawk at. Audio-wise, it is really good. The Sennheiser Momentum 2.0 deliver audio with depth and clarity, with tight bass, prominent mids and controlled highs. The

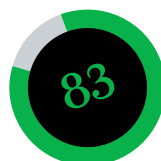


Price
₹15,990

balance of audio keeps low frequencies steady and yet does not overpower tracks with bass. The prominent mids allow vocals to flourish, making voices like David Gilmour sounds beautifully warm and rich. While the highs remain prominent, they are not kept too sharp to decrease any sort of disturbance while listening at the highest volume. The audio delivery, as seen with most Sennheiser products at this range, is supremely clean, and there is no hint of distortion.

However, soundstaging is not the best here, with audio sounding a bit too compact. The musical ensemble for tracks by any artist including John Coltrane and Lynyrd Skynyrd sound rather restricted, instead of being flourished. The headphones are loud, and the excellent in-line microphone make it a good companion for smartphone music. If you have the money to splurge on this baby, go right ahead.

Souvik Das



Performance.....83
 Features84
 Build & Design90
 Value for Money74

Specifications

Impedance: 18Ω; **Frequency Response:** 16Hz to 22kHz; **Sound Pressure Level:** 112dB (1 kHz/1 Vrms); **Contact Pressure:** 3.2N; **Total Harmonic Distortion:** <0.5%

Contact

Phone: 0124-4187-800
Email: <http://en-in.sennheiser.com/service-support-contact>
Website: <http://en-in.sennheiser.com/momentum-on-ear>



Google.org donates \$20M

Google.org just donated \$20 million to improve the technology available for the disabled.

<http://dgit.in/GP20M>



Google Calendar's-goals

Google Calendar's new goal will help you set targets for self-improvement.

<http://dgit.in/CalenGoal>

Bazaar

Apple iPhone SE

The last of them

The Apple iPhone SE was much anticipated, buoyed by the prospect of a compact form factor and powerful hardware combined with the widely popular design implemented in older generation iPhones. Delivering just that, the iPhone SE is unrecognisably iPhone 5s on the outside, and arguably equal to (or maybe slightly better than) the iPhone 6s. Display-wise, it gets a 4-inch Retina panel that is as good as ever, with crisp, sharp contrast levels and excellent viewing angles. The latest addition of Night Shift in iOS 9.3 also makes it more convenient to view in dark environments.

The display itself, no matter how good it is, presents the biggest question mark over the iPhone SE. In today's world of video-oriented entertainment services and graphic-intensive mobile gaming, the world has moved on to an average screen size of 5 inches. In such a world, a 4-inch screen will definitely seem too small for anyone presently using a larger display. For existing iPhone users, it only makes sense for people who still use iPhone 4/4s, but for others, it just does not have the same impact of upgrading a smartphone that you would hope for. It is still excellent, but the 4-inch size does feel restricting now. It takes extra swipes to read a story, and while that may not immediately impact you, it will, eventually.

Performance-wise, the iPhone SE is excellent. Powered by the Apple A9 processor with 2GB of memory, the iPhone SE delivers flawless performance and multitasking. Daily sustenance apps (Facebook, WhatsApp, Mail, etc.) load without any hint of stutters, and gaming is a delight, too. The hexa-core PowerVR GT7600 GPU is powerful, and combined with the smaller screen size, has lesser display area to drive, thereby leading to higher frame rates. Hence, games rich in graphics look absolutely brilliant. Hardly ever will you notice any stutter, even when you multitask with a number of apps open. With its metal build, the iPhone SE does heat up slightly when you run intensive tasks on it for prolonged sessions, but the heat is manageable and nothing major to worry about. Call



Price
₹39,000

performance is clear and apt, and network retention is also excellent.

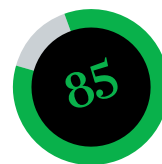
The camera module uses the same, 12MP Sony IMX315 image sensor as the iPhone 6s, and gets integrated 4K video recording and Live Photos. There is no OIS here, and even the noise-reduction algorithms do not seem great. As a result, while it preserves the trademark of iPhone photos with good colour accuracy, the noise somewhat spoils the party in certain situations. It is definitely good, but unfortunately not good enough to compete with the top-of-the-line flagships like the Samsung Galaxy S7 lineup. Head over to our review online to check out sample shots. The front camera has remained the same, although it does get Retina Flash. Apple did not advertise it the way it did with the iPhone 6s, but while it may not be a major influencing factor here, it comes

surprisingly handy at times.

Battery life has still remained a major spot of concern. The iPhone SE survived for only about 4 hours and 30 minutes on Geekbench battery benchmark, and even in real life, it can last for about 12 hours at best. You will almost certainly require a power bank to feel assured. iOS 9.3 runs much smoother, and the cohesive iPhone experience sustains here. Apple had spoken about the iPhone SE getting a larger battery pack than the iPhone 5s, which should have made it better than the iPhone 5s in terms of battery stamina. That, though, is not exactly a benchmark to go by anyway, and the iPhone SE falls in the lower rung of battery stamina for mobile devices.

The pricing in India, however, spells death knell. At ₹39,000, the iPhone 6s is only a few grand more. The iPhone SE would still have made good sense had it been around the 30k margin, but at this price, only a very select few would prefer this over the iPhone 6s. It is indeed an excellent flagship, and possibly the last ever 4-inch flagship smartphone, but it may not sell as much as Apple would like it to. At least, that's what we think.

Souvik Das



Features.....	75
Design.....	90
Performance.....	85
Value for Money.....	67

Specifications

Processor: Apple A9, **RAM:** 2GB, **Storage:** 16GB/64GB, **Camera:** 12MP iSight, **Battery:** 1642mAh

Contact

Phone: +918040455150

Email: bangalore_admin@apple.com

Website: <http://www.apple.com/in/iphone-se/>



FB's video DP

Facebook now allows you to replace your profile photo with a profile video now.
<http://dgit.in/Dvideofb>



Bot for everything

Bot are being designed to replace human in major areas like ordering a burger or order car service.
<http://dgit.in/Boteverything>

Lenovo Vibe K5 Plus

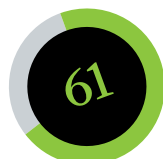
Not the right Vibe



The Lenovo Vibe K5 Plus is a solidly built phone, but the metal finish does feel a tad slippery in your hand. The 5 inch 1080p panel on the device isn't what you call bad, but we've seen much better, even in this price range. The performance of the phone wasn't great either. The Snapdragon 616 is a slight improvement over the 615 and the gaming experience on the K5 Plus isn't as good as the Coolpad Note 3, even though the two phones are similarly powered (despite different SoCs). There are two Dolby Atmos enabled speakers at the back, which are quite loud for a phone in the sub-10k price bracket. The battery life on the



Price
₹8,499



Feature	72
Performance.....	52
Value	52
Design	68

Specifications

Display: 5 inch display with 1920 x 1080p resolution (441ppi);
Battery: 2750mAh; **Storage:** 16GB;
Camera: 13MP rear, 5MP front;
SoC: Qualcomm Snapdragon 616;
CPU: 1.5GHz octa-core; **RAM:** 2GB;
Operating system: Android 5.1;
Connectivity: 4G, Wi-Fi, Bluetooth, Dual-SIM

Contact

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Vibe K5 Plus is another area that needs improvement. It lasted about 5.5 hours on the GeekBench battery test, which is outright poor.

Lastly, the camera on the Lenovo K5 Plus is not as good as the Xiaomi Redmi Note 3, which has a 16MP rear sensor and much faster overall operation. However, it is still comparable to the likes of the Coolpad Note 3 and the Meizu M2 Note.

To sum up, it is quite evident that the Lenovo Vibe K5 Plus is not a particularly good phone. While the display and camera are still acceptable, the battery life and performance are disappointing. It lags marginally behind phones like the Meizu M2 Note and the Coolpad Note 3, and is no match to the Xiaomi Redmi Note 3.

Hardik Singh

Sony MDR-XB650BT

Much improved, still more to do

Sony's Extra Bass lineup has always been about some crazy amount of bass. While the XB650BT does provide that to an extent, it is more balanced to appeal to a wider section of music lovers. Build-wise, the XB650BT does seem slightly bulky. The foam on-ear cushions are rather heavy on the ear, and feels too uncomfortable after about 15 minutes of listening. It is particularly uncomfortable if you're wearing it outside an air-conditioned place, as the heat combined with the foam really sweats up ears.

Audio-wise, there is ample bass, but of a more balanced nature. The lows still sound slightly hollow and loose, but



Price
₹7,999



Performance.....	72
Features	70
Build & Design	67
Value for Money	59

Specifications

Impedance: 24 ohm; **Frequency Response:** 20Hz to 20kHz;
Sensitivity: 95 dB/mW; **Driver:** 30mm dynamic; **Weight:** 190g

Contact

Sony India
Phone: 18001037799
Email: <https://www.sony.co.in/section/contactus>
Website: http://www.sony.co.in/electronics/headband-headphones/mdr-xb650bt#product_details_default

is better tuned to suit more music genres. Mids are ample, and highs are pronounced, which combine with ample bass and good loudness to deliver powerful audio. However, the treble sounds a tad too sharp, and this takes some of the warmth away from the sound. Soundstaging on the Sony MDR-XB650BT is quite decent, actually, which makes intricate audio tracks sound particularly pleasant. The mids are particularly clear and pleasant here.

Audio here on this Sony headphone is not as detailed as we would have liked, and that is somewhat because of the hollowness, which is a bit of a shame. However, the good balance of audio is enjoyable across multiple genres of music.

To sum up, the Plantronics BackBeat Sense delivers superior overall performance over this, and even though the Sony XB650BT is decent, it is simply not good enough being the best in this category.

Souvik Das



Microsoft is helping schools

Microsoft is helping the school with Windows 10 by revealing Windows 10 and Office's Classroom focused features. <http://dgit.in/MicFocSchool>



Windows keypad on iPhone

Microsoft just announced it's Windows Phone Keyboard for iOS devices which will help users to swipe or tap to text. <http://dgit.in/WinKeyios>

Bazaar

ASUS ZenBook UX303UB

Combines elegance with good performance

It's never been only about the looks as far as the ASUS ZenBook's concerned and the UX303UB stays true to that principle. The 13-inch ZenBook's dressed in an all metal exterior, leaving no doubt in anyone's mind that it's a premium notebook. Its signature design element, the spun metal concentric circles are a striking feature of the ZenBook UX303UB, one that definitely heightens the overall aesthetics of the ultrabook.

While the ultrabook weighs 1.45 kg, the notebook doesn't really feel sleek and light when you try to hold it. Unlike the ASUS ZenBook UX305FA and UX305LA that we tested last year, which had tapering edges and shrunk in size along its breadth from the hinge to the front lip, this ZenBook UX303UB feels a bit bulky and chunky, which is a bit of a shame as it takes away from the overall aura of the notebook. Having said that, the ZenBook is quite well built, with a sturdy hinge that holds the screen and the rest of the chassis in place very well.

The ASUS ZenBook UX303UB continues to house an isolated keyboard with chiclet-style keys that are great to type on, no problem whatsoever. The UX303UB's keyboard deck features a nice wide palm rest that's convenient for parking most wrists on it without a hitch. The wide palm rest also houses a large single slab trackpad which has a fine matte finish. The trackpad houses left and right clickable mouse button zones which is great.

In terms of the ZenBook UX303UB's overall performance, it definitely ranks higher than last year's ASUS ZenBook UX305LA and UX305FA, respectively. While both these ZenBooks came with fast-paced SSD storage and oodles of RAM packed into their diminutive shells, the ZenBook UX303UB drops the SSD for a regular spinning hard drive. However, it does better than the previous two ZenBooks in the CPU and GPU department, packing in the latest generation 2.3 GHz Intel Core i5-6200U chip that supports Turbo Boost speeds of up to 2.8GHz under heavy load and NVIDIA GeForce GT 940M graphics with discrete 2GB of GDDR3 memory for some much needed performance chops.

As a result, we found out that the ASUS ZenBook UX303UB is easily one of the fastest ultrabook we've reviewed this year, with PC Mark 8 Creative Score of 3521 and 3D Mark Ice Storm Extreme and Cloud Gate scores of 42,326 and 5,895, respectively.



Price
₹71,490

The ZenBook UX303UB's Full HD 1080p screen isn't glossy and doesn't attract fingerprints. The screen's quite bright and offers decent contrast levels. Both watching HD movies and reading large chunks of texts is handled well on the ZenBook UX303UB's LED-backlit 13.3-inch screen panel. It isn't an IPS panel, though, which means discernible colour shift when you view the screen from acute angles. The ZenBook offers ASUS's SonicMaster audio with Bang and Olufsen technology. Audio output from the notebook was decent and the sound was largely clear and distortion free up to the 70% volume.

The one area where the ZenBook UX303UB disappoints is in its battery output. Its 3-cell battery only lasted for 3 hours 26 minutes in our high performance battery test. This number is shorter than all the other ultrabooks we tested recently, including the ZenBook UX305LA, UX305FA and Dell XPS 13 which clocked just under 6 hours – easily the best of the lot.

In terms of features and connectivity, the ASUS ZenBook UX303UB tries to pack in all the essentials. It also comes with an ambient light sensor to dynamically alter the laptop's screen brightness.

The ASUS ZenBook UX303UB definitely raises the bar in terms of what a ZenBook can offer in terms of performance. It does so while keeping its premium elegance and great looks. It does has its low moments, especially in its bulk and battery life, but nothing that upsets the overall appeal. If you can afford its ₹71k price, this is a good notebook.

Jayesh Shinde



Features.....	66
Design.....	70
Performance.....	70
Value.....	90

Specifications

CPU: Intel® Core™ i5-6200U Processor, 2.3GHz (3M Cache, up to 2.8GHz); **OS:** Windows 10 (64bit); **RAM:** 4GB; **HDD:** 1TB 5400RPM; **Display:** 13.3-inch, Full HD resolution; **GPU:** NVIDIA GeForce 940M 2GB GDDR3 + Intel HD 520; **Weight:** 1.45 kg (with 3 cell battery); **Battery:** 50WHrs, 3SIP, 3-cell Li-ion Polymer Battery Pack; **Keyboard type:** Illuminated Chiclet Keyboard; **Supplied Accessories:** Sleeve & cable

Contact

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Instagram Explore tab

Just like Facebook, Instagram is also paying a lot of attention towards its video services.
<http://dgit.in/Insta-upd>



Apple Develops apps store

Apple is trying to develop the search experience in App Store and has a secret team working on it. <http://dgit.in/AppleASU>

Biostar Racing Z170GT7

A fresh design from Biostar's stables

Biostar has been missing from the motherboard scene but they're making a comeback. The Racing Z170GT7 is from their top of the line Z170 series and is aimed at the enthusiasts. The board has a pretty good looking paint job which looks like a checkered flag. To complement this, Biostar has used vinyl decals with carbon fibre texture atop the VRM MOSFET heatsink and the PCH. And these decals are illuminated by RGB LEDs. Moreover, there's an addition header if you wish to synchronise external LED strips with the onboard arrangement. Another new addition is GT Touch, which



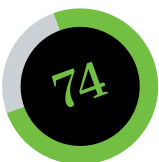
Price
₹16,550

is nothing but capacitive buttons in lieu of the onboard power and reset buttons. The audio I/O ports are gold plated so there's something for audio enthusiasts to look forward to. Some features that are missing from this board is 'official' support for SLI but that's not much of a worry. There's dual BIOS and an M.2 slot with 32 Gb/s bandwidth.

The rear I/O panel has one USB 3.1 Type-C port and Biostar has done away with the SPDIF port, instead it is now offered via a header. SPDIF isn't a popular interface so replacing it to provide an additional 3.5mm jack is sensible. Other than that, the audio segment seems to be standard fare with isolated power circuitry and audio specific electrolytic capacitors.

This board employs a 9-phase VRM circuitry which should help with a moderate level of overclocking. Overall, the Racing Z170GT7 is a pretty good motherboard with plenty of premium features but does miss out on a few features that are omnipresent in the premium segment.

Mithun Mobandas



Features73
 Build75

Specifications

Chipset: Intel Z170; **Memory support:** 4x3200(OC)MHz upto 64GB; **LAN:** Intel I219v Gigabit Ethernet; **Audio:** ALC 898 7.1; **SATA:** 6x SATA III; **Expansion:** 4x PCIe X16(x16+x8+x4+x4); **Dimensions (LxWxD):** 305 mm x 244 mm; **Warranty:** 3 years

Contact

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Gionee Elife S6

All about the style

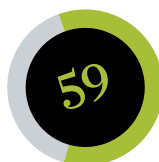


The Gionee S6 isn't the newest phone in the market. Now that's an odd statement to make in a review. What we mean is simply this. On paper, the Elife S6 is similar to an older Gionee phone, the S Plus. The only significant update is that the storage goes up from 16GB to 32GB. Gionee has also tweaked the design a little bit, but overall, there's not much that's new.

The design and build quality are perhaps the strongest aspects of the Gionee S6. The aluminium build of the phone is amongst the best in the sub-20K segment. The Gionee S6 sports a 5.5 inch AMOLED panel. The viewing angles of which, are good and so is the touch response, but



Price
₹19,999



Feature72
 Performance.....58
 Value26
 Design73

Specifications

Display: 5.5 inch display with 1280 x 720p resolution (267ppi); **Battery:** 3150mAh; **Storage:** 32GB; **Camera:** 13MP rear with LED flash, 5MP front; **SoC:** Mediatek MT6753; **CPU:** 1.3GHz Octa-core; **RAM:** 3GB; **Operating system:** Android 5.1.1; **Connectivity:** 4G, W-Fi, Bluetooth, Dual-SIM

Contact

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the colour saturation isn't true to life and the phone could have done a better job with a 1080p FullHD display.

Performance-wise, you need to know that this is by far not the fastest or the best performing phone in its price category. That said, the octa-core MediaTek MT6753 is more than capable of handling most tasks with ease, albeit with an occasional lag. On the other hand, with a 11 hour screen-on time, the battery life is commendable.

The 13MP camera at the rear is fast and takes really good photographs. The colours are quite true to life, and saturation is slightly accentuated to give images a more vibrant tone.

Overall, the Gionee Elife S6 is good, but not great.

Hardik Singh



Google's beacon get an update

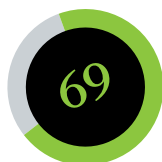
Google has given its beacon a security update, a beacon is a technological solution in search of a problem.
<http://dgit.in/GogBea>



Hasselblad's H6D

Hasselblad has returned with a monster of camera for \$27,000.
<http://dgit.in/H6DMonster>

Bazaar



HP Pavilion x2

An inexpensive hybrid

Features 71
Performance 62
Value 76
Design 69

Specifications

Processor: Intel Atom x5-Z8300; **GPU:** Intel HD; **RAM:** 2GB; **Internal Storage:** 64GB (Tablet) / 500GB (Keyboard dock); **Display:** 10.1-inch, 1280 x 800p; **Keyboard:** Island-style; **OS:** Windows 10; **I/O:** 1 x USB 3.0, 1 x USB 3.0 Type-C, 1 x micro HDMI, microSD card reader, headphone/mic jack combo

Contact

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The HP Pavilion x2 has always been a small and light hybrid laptop, but this latest generation edition of the diminutive yet versatile notebook brings an all new design to the table.

The new model has a sharper profile and a new docking mechanism which is much simpler to use. All you have to do now is hold the keyboard dock with one hand and pull the tablet out.

Like every other hybrid, the tablet is the main component of the package. The tablet the processing power and 64GB of storage, while the keyboard dock holds the 500GB HDD inside. The touch screen on the Pavilion x2 is good. It is very



Price
₹31,190

responsive and easily comparable to the one we saw on the HP Pavilion x360.

A budget laptop always has some compromises and in case of the Pavilion x2, we end up with an Intel mobile processor. That said, the Intel Atom x5-Z8300 processor, can perform all the daily chores satisfactorily. You can't really push it for gaming though, and you will see lags if you do so. Although, If you're gaming in tablet mode, use oven mitts, because it gets quite toasty.

HP has done a good job with the battery of the device. The Pavilion x2 can last 6-7 hours on a single charge, on regular usage. So, if you want the functionality of a tablet and the productivity of a laptop, and can do with just the essential apps, the HP Pavilion x2 is worth a shot.

Hardik Singh

Mi Bluetooth Speaker

Clean, uncluttered audio

Right out of the box, the Mi Bluetooth Speaker appeals with its simplistic design. Wrapped in thin metal with a casual-looking speaker grille and straightforward controls, the Mi Bluetooth Speaker works in terms of being a good-looking speaker. The plastic buttons, though, are not the best, and offer poor feedback.

Another deterrent with the smooth metal build is that the speaker tends to slide and fall off tables. Place it flat on its back and the speaker vibrates to the beat of the music, and you'll need to place it upright to not worry about it falling off.

In terms of audio, the warmth and tightness in the audio delivery is very appealing for a speaker within this budget. Low frequencies are well-replicated, although the mids are somewhat muddled,

and this poses a problem in heavier tracks, with elaborate instruments. The bass is slightly higher than the rest, which sometimes tends to overpower the intricacy of tracks. It performs delightfully well in cleaner tracks, and just about decently across most other genres.

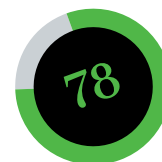
While the Mi Bluetooth Speaker mostly plays clean audio, there is some distortion at higher volume levels.

For a speaker within this budget, it is an excellent product to satiate daily listening needs. It looks smart, plays decent, loud, powerful audio, and does not burn a hole in pockets. Bluetooth range is ample, and the battery lasts for about 5 hours. Overall, the speakers are good for the budget and something you should consider to buy if you're looking for options.

Souvik Das



Price
₹1,999



Performance 84
Features 72
Build & Design 90
Value for Money 61

Specifications

Maximum power output: 3W x 2 (4ohm, THD < 1%), **Loudspeaker:** Ø36mm, **Driver x 2, Channels:** 2.0, **Bluetooth version:** 4.0, **Frequency response:** 85Hz - 20KHz, **Battery capacity:** 1500mAh

Contact

Phone: 18001036286
Email: service.in@xiaomi.com
Website: <http://www.mi.com/in/speaker/>



Drone deliveries

Following Amazon and Google drone delivery footsteps, Australian postal services are testing their own drone delivery. <http://dgit.in/aussidrone>

amazon.com

Amazon's sub plans

Amazon is launching its monthly subscription for prime membership services. <http://dgit.in/AmznSub>

InFocus II 50EA800

Big screen, small budget



Price
₹34,999

The InFocus II 50EA800 is not going to turn any heads but it is fine for its price tag. The plastic bezels fit the ₹34,999 price tag and their thinness give the television a huge footprint. The 50-inch display feels overwhelming, thanks to the thin bezels. Irrespective of how you choose to place this TV in your home, you'll need a pretty big space to accommodate it. The TV has two HDMI



Performance.....68
Value64
Design70

Specifications

HDMI Ports: 2; USB Ports: 2; Size: 50 inch; Resolution: 1080p; Panel Type: IPS; Backlight: DLED

Contact

Customer Care
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ports and one USB port, along with Component, Composite and Headphone out ports. We would have preferred at least one more USB port, and the placement of the HDMI ports is not done well. The ports are placed on a small section on the back, which makes it really difficult to attach devices like the first-gen Chromecast and thick HDMI cables.

It makes up for this in the picture quality department though. The TV isn't meant for 480p content, which looks quite bad, even after the upscaling engine attempts to improve it. Also, while the TV doesn't have InFocus' claimed 5000:1 contrast ratio, you still get pretty good blacks, at this price. The InFocus TVs strength is in colour reproduction.

The InFocus II 50EA800 is a quintessential budget television to buy, and it's very similar to the Micromax Grande LED TV that we reviewed earlier. It's a value for money television, meant for those who are used to streaming content on their TV, or gaming. If you have good quality content to watch then this is the TV for you.

Prasid Banerjee

Mi In Ear Pro

Falls short of the best



Xiaomi has been delivering competent audio products within a budget, and the latest product in its quest for maintaining its reputation is the Mi In Ear Pro, a pair of budget in-ears that go up against the likes of our old favourite, Cowon EMI, and the more recent Brainwavz Omega.

On that note, the Mi In-Ear Pro has a rather uninspiring design. While it is built sturdily, it lacks the finesse of say the Tekfusion Ecoofers, that have a wood finish to add a touch of class in the budget audio segment. This may not be a problem for consumers preferring function over form, but for the really nitpicking users this may prove to be a problem. Even in looks, it is fairly simple, and slightly larger than the likes of Brainwavz Omega and Delta. In terms of audio, the Mi In Ear



Price
₹1,399

Pro cuts a similar figure. It is loud and reasonably clear, but there is distortion at higher volume levels. Xiaomi has used a balanced armature and a dynamic driver to power the audio, but the audio balance is not the best around.

For instance, while the presence of low frequencies is evident, they sound is somewhat muffled and hollow. There is lack of tightness in bass, which makes it sound rather loose. The mids are decent, with ample focus being given there. The highs are quite bright, and have a pleasant tone. However, the treble bias is too sharp and evident, and this combined with the muddled lows disrupt the experience.

It is a decent attempt, but the Mi In Ear Pro is not going to replace the aforementioned IEMs – which are overall better performers – any time soon. However, if you're open to some experimentation and willing to give the new kid on the block a thorough trial, then do consider the Mi In Ear Pro. You will not be wowed, but hey look at its price.

Prasid Banerjee



Performance.....71
Features65
Build & Design78
Value for Money69

Specifications

Speaker Impedance: 32Ω,
Weight: 14g, Cable Length: 1.25m,
Sensitivity: 101dB, Jack Type:
3.5mm Gold Plated, Rated Power:
5mW, Frequency Response: 20-
20,000Hz

Contact

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Website: <http://www.mi.com/in/headphonespro/#overview>



Android N supports VR

Android N will have more extensive support for Virtual reality.
<http://dgit.in/ANVRL>



Road-legal race car

Aston Martin has launched a limited edition called the Vantage GT8 which is absolutely road legal. <http://dgit.in/legalraceA>

Bazaar

Samsung Gear VR

Prepare to look stupid in public

Kicking things off with the build and design of the headset, it's made mostly of plastic and it feels sturdy. There is a mesh of rubber and Velcro which ensures a tight structure around the eyes and comfort as well. The headband has Velcro straps that can be adjusted easily. So if you are one with a big head or a small one, fear not, the headset will fit you. The only con with the headset is the housing where you put the smartphone. The cover that you need to remove feels very cheap and it's the first thing you will lose.

There is a USB port on the Gear VR headset and a touchpad along with the back button rests on the right side. There is a volume rocker on the right too. There is a focus wheel on the top and if you move the focus wheel, you can physically see the smartphone move close and far from the lens.

Another reason why the flap housing the smartphone is flimsy is because if you want to see what's happening in the real world, you can use the smartphones camera to do that. For this you will need to remove the flap. For the audio experience, you'd be wise to use a pair of headphones for a more immersive experience. A good thing about the headset is that it is comfortable even for those with glasses.

Setting up the Gear VR is a breeze. Put your smartphone in the housing, wear the headset and wait for the Oculus app to download. We recommend you remove the headset and go through the app on your phone to download games and apps. It's easier to search for apps and skip pages and type names of the apps you are looking for. This is something you can't do from the comfort of the headset and is major drawback.

The battery life of the device is subject to not only use but the Samsung phone you are using it with. On an average it consumes 20% of your smartphones battery in one hour. We tested the headset with the Galaxy Note 5.

Another downside to consuming content in VR is that you have absolutely no idea what's happening around you. The number of times I've hit my hand to my desk while watching Netflix in VR is a lot! Sticking with the cons, some content looks pixilated at times and despite my efforts to get the image to focus completely, it always seems a little out of focus.

There is another problem while watching movies (we tried this on the Netflix app). When you



change your position, the position of the screen doesn't change. So if you are sitting and watching a movie in VR and you want to lie down or move, the position of the video doesn't adjust to you and that's a big bummer.

But it's not all bad! There are a bunch of things that you will absolutely love on the headset.

For example, there is an animated movie called Invasion that you can check out and it's just the tip of the iceberg for the potential that VR content has. This 5 minute movie shows you a cute and cuddly rabbit who is in the middle of an alien invasion. It was an absolute delight to watch.

Gaming is another area where the Gear VR was a lot of fun. Classic games like Into the Dead and Temple Run which have VR variants are a clear indicator of the level of immersion VR brings to the table. To put things simply, it's the same difference you will face when playing Dance Central with a controller versus playing the game with the Kinect.

Playing a dog fighting game on the VR headset was incredibly fun and there is a game called Samsung School of Rugby that will make you go round and round in one spot, literally.

There is one thing I'm happy to say though. There is a lot of content available for consumption the moment you get your hands on the Gear VR, unlike 1080p, 4K and 3D which suffered from a lack of content at the time of their launch.

Sameer Mitha



Features	80
Performance	75
Design	70
Value	50

Specifications

Compatible with: Galaxy S6, S6 Edge, S6 Edge Plus, S7, S7 Edge, and Note 5 only; **Weight:** 318 grams; **Field of View:** 96-degrees; **UI/Buttons:** Touchpad, Back key, Volume Key, Focus adjustment wheel; **Sensors:** Gyro, Accelerometer, Proximity

Contact

Samsung India
Phone: 1800 3000 8282
Online mailer: <http://www.samsung.com/in/support/erms>



Smart Luggage

Raden's new connected luggage can track your trips and charge your phone as well.
<http://dgit.in/Smrtlug>

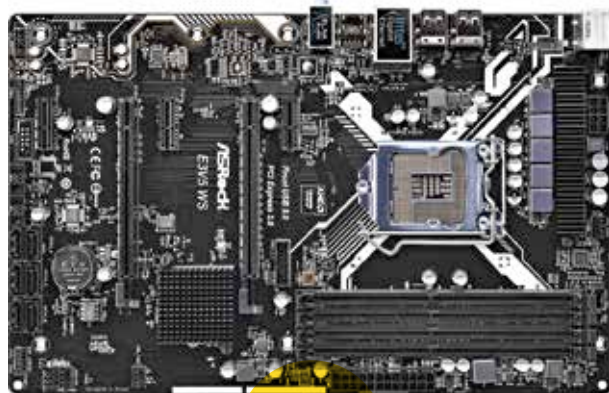


Cam with inbuilt stabilization

Rev'l has launched new action camera named 'Arc' which has inbuilt image stabilization technology.
<http://dgit.in/revlarcx>

ASRock E3V5 WS

When reliability takes precedence



Price
₹13,000

The first thing that people ask about the C232 chipset is the reason for its existence and the answer, according to Intel, is reliability. The ASRock E3V5 WS is based on the C232 PCH and brings enterprise level reliability to the consumer market space. Intel's Xeon processor lineup is rated to run way longer than the desktop Skylake SKUs, even

the C232 chipset is made to last longer than the 100-series chipsets. The ASRock E3V5 WS has support for CrossFireX and ECC memory. The latter feature is only found on server grade boards. And since we've mentioned the word 'server' way too often, it couldn't be any more obvious that this board is aimed at content creators who'd need multiple graphics cards for rendering complex animation sequences or for playing around with high-poly CAD models. This means the board was designed to ensure industrial applications run with ease. Server hardware are generally awful to look at, something that computer enthusiasts would rather throw a bag over and hide away. But since this board supports Skylake desktop SKUs and select Xeon SKUs it's made to look visually appealing. It doesn't have any of the fancy VRM heatsinks but the colour scheme isn't an eyesore. Overall, the ASRock E3V5 WS brings server grade reliability to the average consumer for a decent price.

Mithun Mobandas



Features79
 Build75

Specifications

Chipset: Intel C232; **Memory support:** 4x2133 MHz upto 64GB; **LAN:** Intel I219v Gigabit Ethernet; **Audio:** ALC 892 7.1; **SATA:** 6x SATA III; **Expansion:** 2x PCIe X16(x16+x4), 3x PCIe x1; **Dimensions (LxWxD):** 305 mm x 191 mm; **Warranty:** 3 years

Contact

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Website: <http://www.asrock.com/>

Kingston SSDnow UV300 240 GB SSD

Phison S10, now with TLC



Much has been said about Phison's new S10 controller. It has brought high-performance SSDs to the budget segment. We've seen in before in ZOTAC's Premium line of SSDs and also in Kingston's own Savage SSD. However, with the UV300, Kingston has decided to opt for the much cheaper TLC NANDs to reduce price. Moreover, the SSD does feel incredibly light. The casing is thin, too. Once opened, it becomes apparent that only one side of the PCB is actually populated in the 240 GB SKU which would indicate that the same PCB would be put in use for the 480 GB variant. Kingston does ship the unit with a small height adapter which adds



Price
₹4,499
(+Tax)

two millimeters to the overall height should you ever need a snug fit in certain laptops. TLC NAND sits at the low end of the spectrum which is to say that they are the least durable when it comes to read-write cycles. While TLC NAND has evolved a bit since SSDs were launched, it's always better to be safe than sorry regarding your important data.

Performance wise, the Phison S10 continues to amaze as it outperforms some of the flagships that ruled the roost until a few years back. We do see that moving the TLC has resulted in raw throughput being comparable to Toggle NAND but there is a sharp drop in IOPS, especially when it comes to write operations. Which is where the entire difference lies. These are literally the cheapest good performing SSDs you can buy to quickly get a commendable performance boost. However, if you were to search around, you'd still get last year's flagships for about a few hundred bucks more. They might not offer the same cost-to-GB ratio but they do offer much higher write IOPS.



Performance77
 Build70
 Value for Money60

Specifications

SUV300S37A/240G; Form factor: 2.5-inch; **Cost/GB:** ₹19; **Dimensions:** 100 x 69.9 x 7 mm; **Controller:** Phison PS3110-S10; TLC NAND; **Warranty:** 3 years

Contact

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Mithun Mobandas



Blink Board

Acton has come up with the lightest and cheapest electric skateboard which is a lot fun to ride. <http://dgit.in/blinkboard>



Flyboard

The jet-powered hoverboard exists and has been crashed by the creator. <http://dgit.in/J-PHBoard>

Bazaar

Acer Predator 15

Best performing gaming notebook of this year

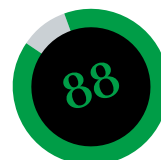
The Acer Predator 15's built like a tank. It's the chunkiest laptop we've tested this year, by far. Right from its screen lid, bezel and its plush keyboard deck and palm rest, the entire surface of the laptop's covered by premium reinforced plastic / tough matte exterior that gives it a unique matte touch and feel that we haven't seen on any other laptop. Its frame weighs a whopping 3.6 kg, which is about a kilo more than a regular 15-inch laptop, but all that extra weight on the Predator is justifiably to give it extra power under the hood and turn it into an unbeatable gaming beast.

In terms of aesthetics, the laptop's screen lid has a backlit Predator logo and two linear accents that give the Acer Predator some much needed character and attitude that's reminiscent of the Dell Alienware laptops. With the the backlit keyboard, in near full darkness, the Predator 15 emanates a warm red glow which gives it a surreal look, which is awesome! All this undoubtedly adds to the unique appeal of the notebook that's guaranteed to make heads turn at whichever LAN gaming party you attend in a cyber cafe or show off at your friend's place.

The Acer Predator has several things going for it that helps its cause, making it stand out from the rest of the contenders in the hotly competitive gaming laptop market. It has a 4K screen – not that you'll be using this a lot while gaming – which future proofs the device. It has one of the best gaming keyboards from SteelSeries that we've seen on a laptop – the feedback is just right and an abundance of macros help the gamer's cause. The Predator 15's wide palm rest has a large trackpad that's quite sensitive on touch. Above the trackpad is a button to toggle the trackpad on or off, which is very beneficial in high-intensity gaming scenarios.

In terms of performance, let's start with the audio potential of the Acer Predator 15. With two red speaker grilles situated on either side of the front lip, and a subwoofer lining its bottom panel, the Predator 15 packs a powerful punch with its audio performance. We've always maintained that the Dynaudio speakers on the MSI G series of laptops are the best we've ever experienced on a notebook form factor, but the Acer's onboard audio

Price
₹1,79,000



makes us seriously re-evaluate the fact. The Acer's audio performance is seriously good!

As you can probably make out from this laptop's specifications column, it's packed to the gills with uncompromising performance hardware. The concoction cooked up by a top-of-the-line quad-core processor in tandem with fast-paced SSD, oodles of RAM and NVIDIA GTX 980M graphics with a whopping 4GB of GDDR5 memory is enough to subdue any game out there. We had a blast playing our favourite games on the Acer Predator 15 – Counter Strike Global Offensive, GTA V, Rise of the Tomb Raider, and more. And the laptop handled all these games effortlessly at their max settings. We encountered no problems whatsoever while gaming on Full HD resolution. Even its battery life of 169 minutes is greater than what we encountered on the MSI GT72 and GE62 gaming laptops, respectively. If anything, the Acer Predator 15 runs only a bit too hotter than the recorded temperature of the two MSI laptops. That's about the only flaw in this otherwise fantastic gaming machine. However, the Acer offers a hot-swappable fan module to insert into its right edge which can help keep temps under control.

The Acer Predator 15 also comes with above-average connectivity options, Killer networking adapters, and a TPM chip to encrypt data. It has Predator Sense built-in, allowing you to over-clock its CPU speed into three different presets, depending on load. The laptop also supports RAID. All in all, this is a true gamer's delight. If you have the money for it, this is undoubtedly the best gaming notebook to buy in the market right now.

Jayesh Shinde

Performance.....	95
Features.....	85
Design.....	77
Value.....	81

Specifications

Screen: 15.6-inch matte IPS LCD, 3840x2160 resolution; **CPU:** Intel Core i7-6700HQ, 3200 MHz; **RAM:** 16GB DDR4 at 2133 MHz; **GPU:** NVIDIA GeForce GTX 980M, 4GB GDDR5 memory + Intel HD 530 graphics; **Storage:** 256GB SSD + 1TB 5400 rpm HDD; **OS:** Windows 10 64-bit; **I/O:** 4 x USB 3.0, Mic, Headphone, SD Card slot, HDMI, DisplayPort, ThunderBolt and Ethernet slot; **Wireless:** Wi-Fi 802.11ac + Bluetooth 4.0; **Optical:** Blu-ray drive; **Extra:** Hot-swappable 3rd fan unit, twin subwoofers, Steelseries keyboard; **Weight:** 3.6 kg

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WiFi Repeaters

Weak WiFi signal? We have the answer. Check out these WiFi Repeaters



Bee keeper raises \$5M

Beekeeper- Application for communications platform for service workers and blue-collar raises \$5M <http://digit.in/Beekpr>



INEXPENSIVE TVs

Most of us can't spend a fortune on a television, but a little compromise can save us a lot of money!



Twitter's MD for China

Twitter just appointed its first Managing Director for China, previously working for Cisco and Microsoft. <http://dgit.in/TwtrMDC>



Shuddle shuts down

Shuddle the Uber like service for kids shuts down on 15 April 2016. <http://dgit.in/shuddleshuts>

Budget TVs



Prasid Banerjee
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Our Zero1 Award Winner in the TV category, this year, was one LG 4K Curved OLED TV. Everyone, here at the Digit Test Labs, has been spoiled by that television, but just like most of you guys, we can't afford it. Which brings us to the point. Have you noticed those inexpensive televisions doing the rounds on Flipkart, Amazon and other e-commerce websites? We've reviewed a bunch of them, and they seem quite good. Yes, there are compromises, but at a price tag less than ₹40k, few would really complain.

Vu is perhaps one of the best known names on this side of the market, and the competition is still quite tough. We often get queries about which TV one should pick in this price range, and sometimes, even we're in a fix. How does one solve such a dilemma? By comparison of course. We picked three of the most promising budget televisions in the market. They all lie in the 50 inch category, and they all have that 'is this even possible!' factor going for them.

Budget TVs have also been eating into the the bigger players' market share. The fact is that giants like LG, Samsung, and Sony are selling 30-40 inch televisions at the same prices that Vu, Intex and others are selling 50-inch TVs for. While this is good for consumers, and every home can have big screen TVs, it's also a difficult choice. Many have asked us whether these budget televisions are worth buying, and after having reviewed many of them, we can confirm that they indeed are. It is now time to decide which TV is the best to buy amongst these budget televisions.

How We Tested

At this price, compromises are expected, especially when it comes to TVs. We don't expect budget televisions to look and feel as good as high-end LG, Samsung or Sony TVs. That being said, compromise shouldn't result in shoddy work. Hence, we covered the features and design category. We took the material used into consideration. More importantly, features like viewing angles and weight were measured.

Budget TVs often tend to come with non-responsive UIs, which can be a problem in the long run. So, we rated the UI of each of these televisions, on ease of use, responsiveness, and the remote. The remote is actually a very important part. High-end TVs today come with Android, Tizen or WebOS, and they have

advanced remotes. For budget televisions, it is important to have responsive remotes, with well placed, easy to press and buttons. Also, the remote must not be confusing.

But none of that is more important than performance. It's a TV after all, and all that really matters is the picture quality. We measured the Contrast Ratio, Black levels at different brightness settings, white saturation at various brightness levels, and the general brightness of the TV. These were done using specialised equipment, along with software-based tools as well. We also measured the colour levels on the display, against sRGB, NTSC and AdobeRGB levels. All this was followed by ratings based on our favourite TV shows - Daredevil, Narcos

and Fuller House, streamed at HD quality. Next, the audio output was taken into consideration, based on both, the loudness and the rated output of the speakers attached. The placement of the speakers often determines whether a speaker suits a large room, or will fit smaller ones.

Lastly, the number of HDMI ports, USB ports, headphone outs etc. were taken into consideration. This is another area where compromises are forgiven, but not enough to hamper usage in the long term. So, missing smart features are still fine, but too few ports aren't.

Our competitors were the Vu Play Series 50-inch FHD TV, the InFocus 50-inch FHD TV and the Intex 50-inch FHD TV.



GoPro targets Toys

Developers of GoPro are targeting the toys, cars and as many Third party apps possible.
<http://dgit.in/GoPROToy>



Dinner Lab shuts down

Dinner lab has officially shut down as per the blog post on the company sites.
<http://dgit.in/dinnerlabshut>



Performance

Vu Play 50-inch FHD

Vu can be credited with having started this segment we call budget televisions. This is why amongst the three televisions in this comparison, the Vu Play 50 inch is the most expensive. The company's website quotes a price tag of ₹40,000, but the TV is also best in terms of performance. The contrast ratio, at 50% brightness, goes up to about 1730:1, according to our tests. This gives it a huge edge over the other two televisions in this test.

Even though the Vu TV doesn't have the best colours at all brightness settings, its contrast ratio is just too high for its competitors. This is accompanied by decent blacks, and expectedly lower white saturation.

Where this TV lacks is in viewing angles, which is very important for a good TV. If you have a large room, you may see a colour shift from some angles. In fact, the volume could use some work as well.

The Vu TV is well suited for regular television. In addition, gamers will enjoy its excellent contrast ratio, which makes games look really good. Using the Chromecast, we streamed Daredevil, Narcos and Fuller House on this television, and the picture looked great for a budget offering.

InFocus 50-inch FHD

The InFocus TV has a lower, 280:1 contrast ratio at 50% brightness, and all other settings at default. It also has the best black levels at this brightness setting, scoring a whopping 19 out of 20 on our test.

It also does very well in terms of colours, and is able to do 97% of sRGB and 77% of NTSC gamuts. If you can bring good content for this TV, you'll enjoy it. That's largely true for all of these TVs, but the InFocus TV does especially well.

The White Saturation for this TV, came out to 6800K, at 50% brightness. This is much closer to the ideal (6500K) than the two other TVs which go much higher.

While colours are its strong suit, audio is not. The InFocus has two 8W speakers, while the other two have 10W units. You may want to buy additional speakers.

Fortunately, these TVs do spare you some money to do that. Another weakness is the fact that it's a tad dim, at about 133 candela/square meter at 100% brightness.

If you subscribe to HD television, the TVs upscaling engine should work well, and while it does work on SD content as well, there's little you can do for such low resolutions at this size.

Intex 50-inch FHD

The Intex TV costs almost as much as the Vu TV. If it were a tad cheaper, it may have easily won this comparison. Even though numbers say otherwise, we really enjoyed watching stuff on this one. But sadly, that's not where this comparison ends.

The Intex TV covers only 67% of NTSC gamuts, and 97% of sRGB gamuts. Its contrast ratio is also lower than the InFocus TV at 240:1.

The Intex TV also had weaker blacks than the other two. It is also weaker in terms of the white saturation levels.

We loved the Intex TV for the brightness. At 100% brightness, it does about 237 candela/square meter. This is almost double of what the InFocus TV can do, and about 34% brighter than the Vu TV. If you have a lot of daylight interference, this is a good trait to have.

The Intex TV is a well balanced television, which is why it needs to be at a more balanced price. At ₹39,990, it's basically as expensive as the Vu TV.

Like the others, the Intex TV is not too well suited for SD television, but good HD content will do you wonders. Its brightness really comes into play while gaming, and it is well suited for rooms where light falling on the screen is an issue.

Performance

Contrast Ratio.....	1730
Brightness (at 50%)	150.8
Black (at 50%)	0.09
White Saturation (at 50%).....	9100
sRGB	100

Performance

Contrast Ratio.....	280
Brightness (at 50%)	108.6
Black (at 50%)	0.39
White Saturation (at 50%).....	6800
sRGB	100

Performance

Contrast Ratio.....	240
Brightness (at 50%)	131.2
Black (at 50%)	0.56
White Saturation (at 50%).....	7500
sRGB	97



VS Code hits 1.0

After about an year Visual Studio Code hits version 1.0 in beta.
<http://dgit.in/vscode1>



Most powerful drone

DJI just released it's most powerful drone aiming at big budget productions.
<http://dgit.in/DJItronex>

Budget TVs



Features and Design

Vu Play 50-inch FHD

Though its picture quality is decent, the Vu TV has only one USB port, which is a bummer. Plugging our Chromecast into it, we had to use the USB cable to power it. This led to no free port being available for a hard drive, or anything else. This can be a problem for those who like to have such devices connected to their TV permanently, and many do.

As mentioned before, the viewing angles are a tad weak as well, and the Vu weighs about 16.5kg. While weight isn't too important an element for TVs, you may want to take it into consideration when making space for the TV. The port placement of the TV isn't the best. There's a cut-out portion behind the TV which is hard to reach and you can barely see the two HDMI ports. The USB port lies on the side.

The UI is pretty responsive and the remote works quite well. Regular control options such as brightness, backlight, sharpness, contrast etc. are available. However, when you turn on this TV, you'll have to turn off the auto light option in order to gain control over the backlight. For some reason, Vu chooses to keep the backlight at 100% by default, which really ruins the picture.

InFocus 50-inch FHD

The InFocus TV has a gigantic presence in any room. It's thin bezels accentuate the 50 inch screen, which makes it feel really big, when compared to the Vu Play or Intex televisions. This isn't a very good looking TV, but it will make its presence felt in your media center. You'd need a large space to enjoy this TV, because being too close to it isn't ideal.

It has better viewing angles than the Vu TV, which makes it ideal for a big room, except the fact that the InFocus TV isn't very loud. If you have connect able speakers, or a home theatre, you're good to go.

The remote for this TV did give us some trouble however. For instance, it would only respond when pointed directly at the TV from certain angles in the room. However, this could be an issue with our particular unit only.

The UI is quite responsive, and the amount of control over various aspects is the same as the Vu TV. The InFocus TV also has the same issue with port placement as the Vu TV did.

The TV does wobble a little bit, so you would want to be careful about where you place it. It's sheer size makes it unstable, but with the right setup, you should be fine.

Intex 50-inch FHD

In terms of build and design, the Intex TV looks quite good. It has plastic bezels like the two others, but a much smaller footprint than the InFocus TV. Consider this a more compact option for those who don't have much room. Its sound output is also good, meaning it's more than enough for smaller rooms.

The viewing angles on the Intex TV are as good as the InFocus TV and it has perhaps the best remote among the three. The Intex TV remote looks like a quaint old TV remote, but it's functional. It has all the right buttons and is very responsive.

The same can be said about the UI as well. It's easy to understand, and functional.

The Intex TV is a comparatively newer product in the budget large screen TVs market, but Intex itself does have a pedigree here.

It follows the general trend, using the right material and adding just enough ports for general users. It is a tad expensive when compared to the InFocus TV. Intex has made compromises, like the others, but most of them are warranted in this price range.

That said, we would have preferred a price tag of around ₹35-36k, instead of the upper end of the ₹40k budget.

Features and Design

Remote	3.5
Weight (in Kg)	16.5
Viewing Angles	3.5
Responsiveness of UI	3.5
Ease of Use	4

Features and Design

Remote	3
Weight (in Kg)	12
Viewing Angles	4
Responsiveness of UI	3
Ease of Use	4

Features and Design

Remote	3.5
Weight (in Kg)	11
Viewing Angles	4
Responsiveness of UI	4
Ease of Use	4

**iPhone-Card Reader**

Lexar's new iPhone compatible card reader is tiny and so compact that it might get lost in your bag. <http://dgit.in/LexariPhone>

**ZMorph 2.0 SX**

There is a new combination of lazer engraver, 3D printer & CNC milling machine by Zmorph. <http://dgit.in/ZmorphSX>

**Connectivity****Vu Play 50-inch FHD**

As mentioned before, the Vu TV has only one USB port. There are two HDMI ports, Component and Composite ports and a headphone jack as well. The budget crunch means there's no WiFi connectivity, which is true for all of these TVs.

If you're planning to turn this TV into a smart TV, using things like an Apple TV, Chromecast etc., you may be disappointed. Those using a regular SD TV should be fine though.

There's also a headphone Out port for those who care about that.

Connectivity on these televisions can be an issue for some, but the compromise comes because of the cheaper price tags. The Vu Play Series isn't the only television that we've had connectivity issues with. We've reviewed other TVs from Vu where we've been left wanting more in terms of connectivity and ports for devices.

Also, if you plan to wall mount this television, then you would be wise to have HDMI devices permanently connected. The HDMI ports are placed at the back, facing downwards, so they can be a hassle to get to whenever you want. The company provides both wall mount and stand options along with the television, in the box.

InFocus 50-inch FHD

As mentioned earlier, the InFocus TV has similar problems with port placement as the Vu Play. It also has the same number of HDMI ports. While at ₹40,000, we think the Vu TV could have another USB port, and possibly even an extra HDMI port, it's more acceptable for the InFocus TV, at ₹34,999. However, the InFocus shouldn't have passed on the extra USB port since it's quite essential.

Another problem with the InFocus TV is the fact that its HDMI port doesn't accept devices like a first generation Chromecast, or thick HDMI cables. This is because the console on the back doesn't have enough space for them to fit. Like the other two, this TV doesn't support WiFi as well.

The port placement and size of the InFocus TV doesn't make it very well suited for wall mounting. Like the Vu TV, this also has its HDMI ports facing downwards, which can be an issue.

In a lot of ways, the InFocus TV shows small missteps by a new entrant in the market. It's a very good television, overall, but if InFocus happens to fix these small issues in its next devices, they'd be a formidable force in the Indian television market, which has always been a big one.

Intex 50-inch FHD

While the other two TVs we've mentioned lack the second USB port, Intex has included it, which earns it some brownie points. There are two HDMI ports and the placement is the same as the other two. However, the console easily fits most devices. In terms of connectivity options, the Intex TV fares better than its competitors.

The Intex TV has ample amount of connectivity ports and they're well placed. Its power cord is quite short though, which is a recurring problem among these TVs. You would need extension boards, or plug points right next to them.

The two 10 Watt speakers on this TV are located at the bottom, making it ideal for wall mounting. The fact that it has a comparatively smaller footprint, is a bonus in this case.

Along with the other options mentioned above, the Intex TV has Component and Composite ports, a headphone jack and also a PC Audio In jack. There's a VGA and RF In port as well.

It's worth noting that the USB ports on all these televisions are USB 2.0 ports, which is what you should need for FHD quality playback. Manufacturers have been reserving the USB 3.0 ports for 4K TVs.

Connectivity

HDMI.....	2
USB 2.0.....	1
Headphone Out.....	1
Component.....	1
Composite.....	1

Connectivity

HDMI.....	2
USB 2.0.....	1
Headphone Out.....	1
Component.....	1
Composite.....	1

Connectivity

HDMI.....	2
USB 2.0.....	2
Headphone Out.....	1
Component.....	1
Composite.....	1



Live 360 Video

Youtube introduces live 360 videos aiming to give everyone prime experience. <http://dgit.in/YLive360>



PS4 NEO

Sony's upcoming 4K Playstation codename 'Neo' will have better graphics and smoother gameplay. <http://dgit.in/SonyNEO>

Budget TVs

Things to consider when you're buying a budget TV

As we mentioned at the start, buying a budget TV can be difficult. It's not just a matter of the brands, but one needs to be sure of his or her requirements. You should seriously consider what you're going to use your television for.

Watch regular SD television: Do you usually watch regular SD TV channels? If so, then you should probably be going for smaller screens, and 50-inch FHD TVs aren't the best option for you. While many of these TVs do have their own upscaling engines, they don't compare to premium, high-end televisions, and SD content is a bane for them.

Are you a gamer: We've often been contacted by gamers, asking whether these budget large screen TVs would suit their Xbox and PS4 needs. Well, the short answer is yes. As we've said in the comparison as well, if you can bring good quality content for them, these TVs really excel for their price. Hence, they are ideally suited for gamers, who would prefer to spend most of their budget on other gaming equipment.

Stream a lot: Video streaming is quickly catching up in the Indian market. Netflix's entry brought about a wave, and though the company has reportedly not done too well here, people are starting to take notice of apps like Hotstar, Eros Now and many others. But, these apps need WiFi, and since many of these TVs don't support that, you'll need to have Chromecasts or other ways to get the content to the TV.

Need smart features: This is another property that these TVs lack, and understandably so. If you're looking for good looking UIs and lots of smart features, your best bet is to attach a Chromecast. If you want a Smart TV, we'd suggest looking at other, slightly more expensive options. These very companies have been bringing the cost of smart TVs down as well, but they haven't really been able to bring them to uber affordable ranges at the moment.

Compromises

The smartphone market has been blurring the line of differentiation between budget

and high end phones, but it's not the same with TVs just yet. Yes, these televisions are quite inexpensive, but one needs to realise that compromises will be made.

For one, the number of ports are often limited, as you may have already noticed in the comparison. Furthermore, if you're looking for good looking TVs, these don't exactly fit the bill. They look quite pedestrian, but enough to fit the budget. Companies like Vu and Micromax have been pushing the boundaries in this direction, which is evident from their 4K offerings, but they still have some way to go. For example, metallic finishes are nonexistent in this price range, at the moment.

Lastly, and most importantly, these TVs are lacking in all the smart features one can think of, and they can't upscale content as well as premium TVs. So, one should be certain that they play the right kind of content on these televisions. Not doing so can leave you quite disappointed, even though you've spent comparatively less money.

Winner: InFocus 50-inch FHD



The cheapest option isn't always the best one to buy, but in this comparison, the InFocus TV takes the prize, thanks to its price tag. At ₹34,999, it's about ₹5,000 cheaper than the other two televisions, and it takes the prize.

As we wrote earlier, this TV excels in colour reproduction, and that's what makes it the best buy in this comparison. Its black levels are the best amongst the three, which is another point in its favour. While the white saturation could have been a tad better, this TV would suit most regular users, and gamers would also enjoy it.

In fact, we tried playing the Gears of War 4 Multiplayer Beta edition on this, and its large footprint made it a treat. If you

can bring good content for this television, you'll have absolutely no issues with this TV, and its large footprint and good viewing angles makes for a really immersive and enjoyable experience.

The InFocus TV is not our best performer, but when the budget matters, this is the most value for money that you'll get in this price range. In fact, being a new entrant in the Indian market, InFocus has chosen the right price. Its performance is almost as good as the Vu Play Series, and that is why it makes the cut as the best buy. If you're looking for a 50-inch TV, then this is the TV you should go for. You can use the extra ₹5,000, to buy yourself a good set of speakers to enhance your audio.



Facebook VP leaves

The Vice President of Facebook has resigned to join Sequoia Capital after working eight years with Facebook. <http://dgit.in/FBVPLeaves>



Netflix shares

Netflix just posted it's quarter earning and it looks pretty rough for the company. <http://dgit.in/NetflixShare>

FASTER STRONGER FARTHER

THERE COMES A TIME WHEN YOUR ROUTER SIMPLY DOESN'T CUT IT ANYMORE AND A REPEATER IS PRETTY MUCH WHAT SOLVES YOUR CONUNDRUM.

Mithun Mohandas
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Repeaters aren't just for big warehouses and large office spaces anymore. Youngsters these days bleed Wi-Fi to the extent that you'd call 'em Gen-Wi-Fi instead of Gen-Y. More and more of us common folk have begun looking towards these miniscule devices as a measure of adding convenience to our lives. Most homes have routers these days, such is the

prevalence of these devices that signal congestion has become a reality to deal with. While there are technologies that have been added to the Wi-Fi standard to deal with these issues like Beam-forming, the sad reality remains that these devices are still more common in high-end devices. And most of us would rather settle for a router that costs less than ₹2,000 so the likelihood of budget routers have Beam-forming is rare. So the easiest solution is to buy a router which costs roughly ₹5,000-7,000 and

you'll no longer have to worry about not getting a signal in the remote corners of your home. But we know that this is hardly the case since the general folk aren't well-informed about the drawbacks of cheap routers so they get the runt of the litter and only when they set up their router do they realize the gravity of the situation. And instead of buying a new router which is undoubtedly a good approach, people have started looking towards Wi-Fi repeaters as a solution.

They go by many names, Wi-Fi Boosters, Range Extenders, Wireless Repeaters, Signal Amplifiers, etc., and these are just the technical terms. For the uninitiated, let's take a brief look at what repeaters do. Repeaters take an existing Wi-Fi signal which might be a little weak and then broadcasts it again. Have a look at the image on the next page, the blue zone is where your existing router is easily accessible without signal drops and other issues.

App Store developer site

Apple just launched an App store developer website which aims to provide developers with guides and videos for growing app business. <http://dgit.in/AppSDev>



BB Trolling Apple?

BlackBerry might be okay with the government to spying on you personal data. <http://dgit.in/BBtrollsios>

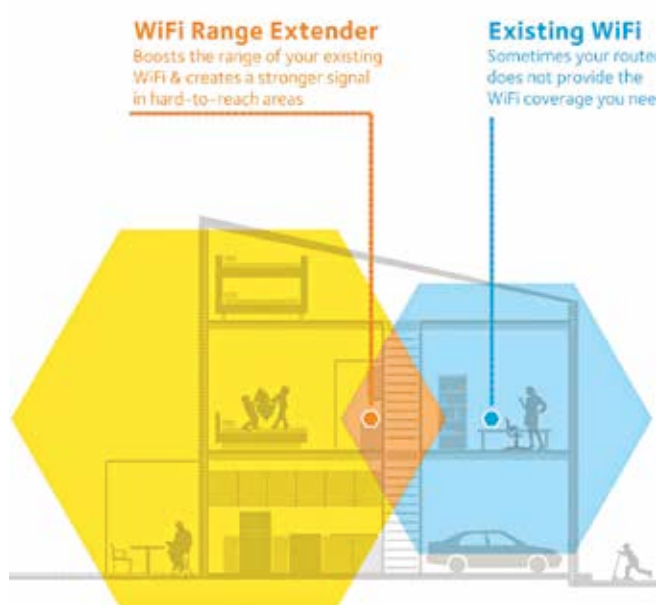
Wi-Fi Repeaters

these things will not be noticed since the bandwidth consumed during normal Internet usage isn't enough to hit the bandwidth threshold. But we high bandwidth multimedia like Netflix, locally stored movies being streamed within the house, this bandwidth cap can be easily hit. In fact, most repeaters still function in the same manner despite this issue having received more than its fair share of attention.

One of the solutions to this problem is to receive on one Wi-Fi band, say the 2.4 GHz band, and transmit on the other, i.e. the 5 GHz band. There are very few devices that actually perform in this manner. The NETGEAR EX6200, Linksys RE6500 and the D-Link DAP-1650 are three such devices which don't suffer from the 'half-bandwidth' problem when configured properly. However, they are quite expensive and if your router is really old, then the best course of action would be to buy a better router than going in for a repeater. However, let's say you do have a kickass router but suffer from the my-home-is-too-darn-huge problem. And you need to get a repeater. So what should you choose? Well you'll have to read the entire article for that. But let's say you've gone and bought yourself a new router, here's how you should set it up.

SETUP

We are assuming you've already picked the best possible location for your router to start with and despite that, your network doesn't reach the farthest corners of your home. So to start off, you'll have to find out the places in/around your home where you'd like Wi-Fi coverage but don't have it. There are apps



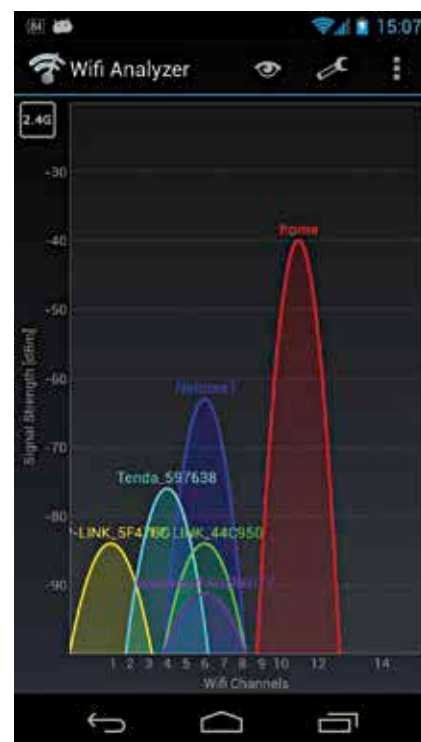
The repeater increases the range of your original signal

that will let you figure out which Wi-Fi networks are available in the area and what band they are transmitting on, the channels that they're currently on and the signal strength of the same. We used Wi-Fi Analyzer for our testing. Then you'll have to generate a heatmap of your home using this data. Take your home's floor plan and draw a grid over it. Now go and place your smartphone in the centre of each box in the grid and note down your Wi-Fi strength.

A simple rule of the thumb to follow to understand signal gain is that the bigger the number, the better signal gain you get. Since you'll be seeing signal gain in negative numbers, the rule still applies. -30 dBm is bigger than -65 dBm and the former would mean you have excellent reception while the latter means you have average reception. Once you have

your entire home charted out according to signal strength you should see if you can move your router to improve signal coverage. If the router happens to be in the best place possible then locate a spot where the signal strength is roughly half which should be in the vicinity

The range extender, if placed properly, will replicate that signal and ensure coverage in farther areas from the main router. There is an inherent issue with repeaters. They ride the same band and channel as your router if not configured properly and that means it can only talk or receive at any given time. So over a duration, half the time the repeater will be sending data and the other half it will be receiving. We refer to this as having half the duty cycle. Now most of the time,



Wi-Fi Analyzer



WeChat Enterprise

WeChat just launched WeChat Enterprise which is targeting the office going section. <http://dgit.in/WeChatEnterprise>



Hacked in 60 minutes

iPhone was hacked by a security firm in 60 minutes. How safe are our phones? <http://dgit.in/60minhack>

HOW WE TESTED

Last December we'd conducted our annual Zero1 awards and the router that won the award was the D-Link DIR-890L, a beast of a router with excellent transmission characteristics. Needless to say we used it for this benchmark. This is how we set up our testing infrastructure.

Since we wanted to test the repeater's capability, it was essential to keep both the transmission and reception wireless. So two endpoints were configured. One was our test rig which was connected to a PCIe Wi-Fi adapter with a massive 1900 Mbps bandwidth with 600 Mbps on the 2.4 GHz band. On the other end we used the D-Link DIR-890L which too has 600 Mbps on the 2.4 GHz band. A laptop with a Gigabit Ethernet port was connected using a CAT6 cable to the DIR-890L to ensure no bottlenecks. The repeater was placed at an equal distance from the two endpoints and the distance was increased to check transmission characteristics in different zones.

Zone 2 – Median – Roughly 30 feet

This is the ideal distance for most of our test since signal strength had dropped to roughly 50 per cent at this range.

Zone 3 – Dead zone – Roughly 40 feet

This zone was behind 3 walls with a lot of high voltage cabling running between them, making it sort of a non-permeable surface. Only one repeater managed to pass this test.

Endpoint 1 - Test Rig

- CPU - Intel Core i7 6700K
- Motherboard - ASRock Z170 Extreme7+
- RAM - Corsair Vengeance LPX 32 GB
- SSD - SanDisk Extreme II 240 GB
- GPU - GALAX GTX 980 Ti
- Cooler - CoolerMaster TX3
- PSU - Corsair RM1000i
- PCIe - AC1900 Wi-Fi Adapter

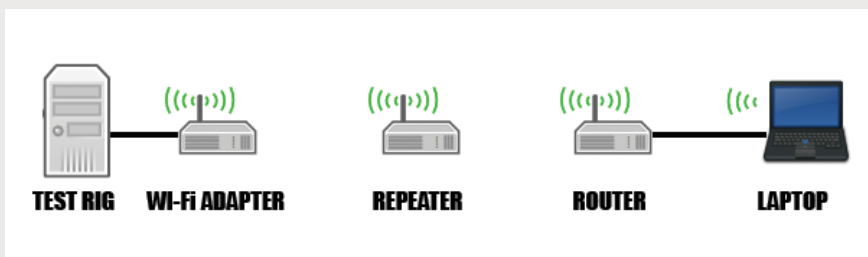
properties of the Wi-Fi adapter and Ethernet ports to ensure that bottlenecks would not come into the picture. Power saving features under the Green Ethernet Technology (802.3az) were turned off to ensure maximum performance. On the wireless front, any similar features were turned off. The performance difference was negligible but we decided to play it safe and keep them turned off.

Each repeater was then prepared for testing, the latest firmware was downloaded from the respective regional websites and updated. After the firmware update, the devices were reset and then finally set up in Extender mode. Antennae, if present, were aligned according to the guidelines mentioned in the manual or tilted with an angle of 45 degrees between them.

For benchmarking throughput, we used iperf3, the most versatile piece of software for measuring networking performance. TCP throughput was measured over a period of 20 seconds with a 40 KiloByte TCP window and 20 parallel streams. The same test was run five times with a time gap between runs to ensure that anomalies wouldn't creep into the test scores. Both TCP uplink and download bandwidth were obtained using this method.

We also used iperf3 for testing UDP transmission and calculating jitter. No window was set for UDP so as to allow the datagrams to be received without any hindrances. For short distances i.e. Zone 1 and 2 we used a datagram bandwidth of 1000 Mbit/s and 100 Mbit/s for Zone 3 since all higher bandwidth commands failed in Zone 3.

Lastly, we used WirelessMon to constantly monitor signal strength across all Zones.



Test Configuration

Zone 1 – Closest – Roughly 15 feet

The repeater was first setup over here and peak transmission rates were obtained when the repeater was closest to the endpoints.

Endpoint 2 - Laptop

- Router - D-Link DIR-890L AC3200
 - Connected via GbE to laptop
- On both end-points we modified the network

of -60 dBm. There should be a hemispherical band which falls in this particular signal strength. Figure out the best (often the centermost) spot and place your repeater. Most units come with WPS (Wi-Fi Protected Setup) so setting up is absolutely easy, just press the WPS button on the repeater and then press the WPS button on the router within a minute. The window for pressing the button could be as short as

20 seconds or as high as 180 seconds, so the sooner you can press it, the better it'll be. Most repeaters have an Ethernet port included so you can always manually set it up.

Note: Often repeaters will provide a randomly generated URL should you ever need to configure it later on. Do not lose this or you'll have to manually key in every local IP address within the subnet which amounts to 256 different

IP addresses to locate the UI of the repeater. Needless to say, that is not something you want to do, possibly ever.

BUILD QUALITY

We liked the way the D-Link DAP-1620 is built, the antennae rotate in such a manner that you can easily adjust the antenna field to get coverage along the horizontal and vertical plane. The WPS button is easily reachable and the built-in signal

strength indicator is a welcome feature. The unit is quite large and easily noticeable, something that might not appeal to certain folk. NETGEAR WN3000RP and TP-Link 860RE are quite similar to the DAP-1620, in that they both have external antennae but there are unique features to both as well. The 860RE has an AC mains pass-through socket which means you don't lose functionality of your AC mains socket just



CS 1.6 on Android

Now you can play Counter Strike 1.6 on your android smartphone. <http://dgit.in/cs16andro>



Aura SSDs

Aura SSDs are the best possible way to upgrade your Macbook, but it is not compatible with Bootcamp. <http://dgit.in/Aurassd>

Wi-Fi Repeaters

because it is occupied by a repeater but it still is really big. The NETGEAR WN3000RP is the smaller than the two and even has signal strength indicators which help you pick the best location for the extender. In a way, the WN3000RP makes it much easier for the average person with next-to-zero networking knowledge to set up a repeater. And then there's the RE200 which is a little big but it exhibits better signal gain so we're guessing that it houses a bigger PCB with a significant portion being used as antennae. The overall design of the 200RE is a lot more aesthetically appealing, so much that they've merged the WPS button into the design making it a little inconspicuous.

The D-Link DAP-1320 and Edimax Air units follow a very minimalist design in the sense that they have nothing but a status LED and WPS buttons. While this is a lot more appealing to a certain segment of the consumer base, there is the simple fact that troubleshooting these devices becomes a little difficult. Without an Ethernet port, you will have to resort to resetting the devices in certain situations and upgrading the firmware becomes a lot riskier over a wireless connection.

Lastly, we have the Edimax Mini and the Digisol DG-WR3001N which look exactly the same. The distinguishing features are the printed text along the body and the Digisol unit has a small mode switch on the side. No doubt, these were manufactured on the same factory line but the Digisol unit happens to be the better model because of the mode switch. Incorporating three modes will have cost a little extra and we'll see later on how they differ in terms of performance.

UI

The router UI is quite important for end-users, be it for the common folk or the enthusiasts. There's the fact that setting up networking devices is often a one-time thing and then you forget about it. So there appears to be little value in working on the UI but there's also the fact that the working on the UI isn't as difficult as working on the core hardware aspects. It's the little things that make a difference and a cumbersome UI adversely affects user experience.

Among the repeaters we tested, we found the NETGEAR WN3000RP, D-Link DAP-1320 and D-Link DAP-1620 to be the most user friendly. If you've used other devices from the same manufacturer, then the familiarity factor certainly helps with navigating through the UI. TP-Link with their RE200 and the TL-860RE are quite polished as well. It's only when you compare them with the aforementioned NETGEAR and D-Link products that the TP-Link UI seems to pale a little in comparison.

Edimax's UI could definitely use some reworking. While the Air and the Mini do certainly look pleasing, the UI is very stale and belongs in

the previous decade. It is functional in all aspects but that's about it. Digisol on the other hand definitely needs improve



Edimax EW7436RPN Air

the UI, we say this because certain features didn't even function properly, and that is the least you can expect from a UI. While upgrading the firmware to the latest version, the DG-WR3001N would not recognize the firmware binaries. A direct firmware upgrade service over the internet would have been considered as a workaround but this unit doesn't have that so you're stuck with the dysfunctional manual upgrade interface. And upgrades are often quite crucial, especially when switching platforms.

PERFORMANCE

There were a few surprising results when the benchmark scores were tabulated. We expected uplink and downlink speeds to be more or less the same with minor differences between products but it turns out that certain products did not perform as well as we'd assumed. Roughly half the devices had uplink speeds which were within the vicinity of 50 Mbps while the remaining half were lower than expected. TCP performance for the Edimax Air, Digisol DG-WR3001N and D-Link DAP-1620 were very close. The DAP-1620 had very less jitter in UDP performance compared to

the Edimax Air and the Digisol DG-WR3001N. In fact, if we are to disregard the moderate level of jitter that the Digisol unit exhibited, it pretty much performed way better than the rest. Even the signal strength was the highest we'd recorded across all devices.

The NETGEAR WN3000RP fell a little short of the rest with TCP performance and the jitter was off the charts, literally. It's one of the few things that should ever be off the charts with any device but we didn't notice any issues while streaming videos off the device which would indicate that the jitter levels were still too low to produce any noticeable affects.

Both TP-Link devices fell short in the TCP test with the RE200 scoring roughly



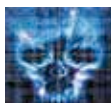
D-Link DAP-1620

half of what the other devices were outputting. But jitter levels were way lower. The TL-WA860RE didn't do well either and we tried fiddling with the antennae to see which configuration would help but things didn't work out for the device. The external antennae did help when the device was placed in Zone 3 as we noticed a good amount of time between connection drops. Zone 3 was the most difficult to penetrate and the TL-WA860RE was visible at all times.

Lastly, the Edimax Mini and D-Link DAP-1320 were at



TP-Link TL-WA860RE



Cyber Attack detecting AI

MIT's latest Artificial Intelligence can automatically detect upto 85 per cent of Cyber Crime. <http://digit.in/AICyber>



Go Pro - VR

Go Pro is launching new Virtual Reality camera which looks amazing. <http://digit.in/goprovr>



Brand		Edimax	D-Link	Digit	Edimax	TP-Link	Netgear	
Model		EW-7438RPn Air	DAP-1320	DG-WR3001N	EW7438RPn Mini	TL-WA860RE	WN3000RP	
Price (₹)		5,299	3,696	2,999	3,840	3,599	4,090	
Warranty		1	1	Lifetime	3	3	1	
Scores								
Performance 2.4 GHz		89	69	90	65	35	52	
Performance 5 GHz		NA	NA	NA	NA	NA	NA	
Overall Performance		45	35	45	33	18	26	
Build & Design		30	30	54	48	90	78	
Features		63	48	63	75	90	75	
Value for Money		45	52	90	64	78	65	
Final		46	41	63	55	69	61	
Features								
802.11 protocol		b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	b/g/n	
H/W WPS Button		Yes	Yes	Yes	Yes	Yes	Yes	
Reset Button		No	No	No	No	Yes	No	
Single / Dual Band								
On/Off Switch		No	No	No	No	Yes	Yes	
Antennae	Internal	Yes	Yes	Yes	Yes	No	No	
	External	No	No	No	No	Yes	Yes	
Security	WPA / WPA2	Yes	Yes	Yes	Yes	Yes	Yes	
	WEP	Yes	Yes	Yes	Yes	Yes	Yes	
Mobile App	Android	Yes	No	No	Yes	No	Yes	
	iOS	Yes	No	No	Yes	No	No	
	Windows	No	No	No	No	No	No	
Dimensions (in mm)	Height	42	53.5	NA	65	NA	67	
	Width	42	42	NA	42	NA	55	
	Length	72	48	NA	38	NA	34	
No. of Ethernet ports		0	0	1	1	1	1	
Ethernet Cable Provided		No	No	Yes	No	Yes	No	
Build & Design								
Adjustable antenna		No	No	No	No	Yes	Yes	
WPS Prominent		Yes	Yes	Yes	Yes	No	Yes	
Signal Strength Indicator		Yes	Yes	Yes	Yes	Yes	Yes	
Ethernet		No	No	Yes	Yes	Yes	Yes	
Ventilation slits		Yes	Yes	Yes	Yes	Yes	Yes	
AC mains Pass through		No	No	No	No	Yes	No	
Bandwise LEDs		No	No	NA	NA	No	No	
Mode Switch		No	No	Yes	No	No	No	
Performance								
Zone 1 (2.4 GHz Throughput)								
TCP Downlink		48.26	33.4	47.45	31.01	19.29	30.95	
TCP Uplink		47.49	47.67	36.77	40.08	23.01	39.7	
UDP Downlink		911	940	944	893	918	911	
UDP Downlink Jitter		25.331	80.96	55.77	32.424	169.499	272.123	
UDP Uplink		85.5	60.8	51.6	30.3	20.9	66.7	
UDP Uplink Jitter		1.764	2.124	2.501	54.947	4.09	5.133	
Signal Strength		-19	-25	-13	-21	-30	-25	
File Transfer (1000 MB Sequential)		21.56	21.48	27.85	25.55	44.50	25.79	



Virtual Desktop

Virtual Desktop for VR might be what should be looked forward to being the future of our desktops. <http://dgit.in/VRDesktop>



Play Station VR

Sony will let you test the Play Station VR months before it launch. <http://dgit.in/PlaystnVR>

Wi-Fi Repeaters



D-Link	TP-Link
DAP-1620	RE200
5,355	3,049
1	3
81	53
90	65
86	59
78	30
87	66
60	64
78	55
ac/a/b/g/n	b/g/n
Yes	Yes
Yes	Yes
Dual	Dual
No	No
No	Yes
Yes	No
Yes	Yes
Yes	Yes
No	No
No	No
No	No
NA	NA
NA	NA
NA	NA
1	1
No	No
Yes	No
Yes	Yes
Yes	No
Yes	Yes
Yes	No
No	No
No	Yes
No	No
46.46	23.29
49.92	20.35
947	922
2.314	5.517
83.4	28.9
2.086	23.096
-32	-20
20.51	50.32

par and overall scored around the average level. Even though the Mini and the Digisol DG-WR3001N appear to be the same physically, there was a marked difference in performance and the Digisol repeater had much greater signal strength than the Edimax Mini.

WINNERS

While we only have enough real estate to show performance on the single band, the repeaters were tested on both bands whenever present. Needless to say, dual band repeaters have the upper hand but we've provided the final scores for the 2.4 GHz band and the 5 GHz band. Should you not need a dual band device you can pick the best repeater on the 2.4 GHz band and if you need a repeater that is dual band then we've got you covered as well.

Best Performer

D-Link DAP 1620

There was no doubt that the only AC1200 repeater in the entire comparison was going to win the Best Performer award. It has a lot of things going for it, there is the dual band capability which makes this better suited to cater to more devices than the rest of the contenders. The adjustable antenna are a much needed feature and the UI is one of the best ones we've come across. It doesn't provide the best performance in the 2.4 GHz band, the DIGISOL DG-WR3001N beats the DAP-1620 by a small margin.

Best Buy

Digisol DG-WR3001N

Apart from having the highest throughput on the 2.4 GHz band, the Digisol DG-WR3001N is also laden with features found in repeaters that are slightly more expensive than what it



Digisol DG-WR3001N

sells for which makes the DG-WR3001N more appealing economically. It had the best signal strength within two of our test zones which is another thing that's good. But the UI is the exact opposite, i.e., as unappealing as can be with certain kinks that should have been weeded out in the product design phase. However, for the majority of users, setting up a wireless repeater is a one time job. Since the device offers the highest value for money among all the devices in our benchmark, it gets the Best Buy Award.

Editor's Pick

TP-LINK RE200

The Editor's Pick award is often a difficult choice. For this com-



TP-Link RE200

parison test we wanted to pick a device which offered the best of both worlds, i.e. performance and value for money. And it was really close.

On one hand we have the Edimax Mini which is a pretty good device but the UI needs work and there are no external antennae which are a much valued feature. And then there's the TP-Link RE200, it's a dual band device and has a very stylish design, something that quite a lot of people will find appealing. However, it lacks external antennae and has no ventilation slits at all which lost it quite a few points. The UI is certainly not the best we've seen.

The TP-Link TL-WA860RE is a pretty decent looking device with a unique feature - an AC mains pass through. However, the performance was sub-par which made us think it over. Lastly, we have the NETGEAR WN-3000RP. It's got the best UI but there's only a single band. It has adjustable antennae and a set of indicating LEDs which make the setup process a lot easier.

Having looked at all of these factors, the final contenders for the Editor's Pick were the NETGEAR WN3000RP and the TP-Link RE200. The NETGEAR unit has a better product design but lacks dual band support while the TP-Link unit loses out on points for product design but gains quite a lot for the dual band support.

When you consider the fact that a dual band support is more essential in the long run, it becomes evident that the TP-Link RE200 should get the Editor's Pick and rightly so, we've made our choice. Do write in to us with your thoughts on the winning candidate. **[4]**

Community

Here's the best pick from what our enterprising readers have contributed towards this month.



Your new AI manager

Amazon's Alexa is capable of adding events into Google Calendar just by voice. <http://dgit.in/AlexaGoogleCalendar>

The (im)Perfect Race

Mankind as a whole might be striving to make the most of our existence but there are a few odd ones out who're hell bent on going the other way. Here are the stalwarts of devolution!



Fart Extinguisher

Gerrard Jesse of Philippines has quite an impressive skill. Not only does his skill have utility value but it's also hilarious. If the image hasn't given it away yet, this magnificent human being holds the world record for most candles extinguished with farts. Yes, farts! One can only image how entertaining the guy must be at parties, especially his own birthday party.

Snail Face

Fin Keheler is just an ordinary 11-year old kid. He goes to school and does what every other 11-year old kid does in his free time – dunk his head into a tub full of snails. We're a little curious to learn how Fin's love affair with molluscs began but one thing's for certain. He sure loves snails, enough to pile 43 of them on his face in an attempt to break the record.



Titanium Nads

There are very few things that can stand to be compared against the pain of getting kicked in the family jewels. But not for Kirby Roy. When he's not busy teaching kids the mysterious ways of Ninjut-get-kicked-in-the-nads-su, he's busy breaking the record for the most kicks taken straight to the holiest of holy places. His record? 1,100 pounds of force.



Toilet crash ... dummy?

Kevin Shelly is one really confused person. While most people would instinctively associate a toilet seat with the human butt, Kevin thought otherwise. He's held the Guinness World record for most toilet seats broken by one's head in under a minute. If you've ever come across a washroom with all toilets broken, Kevin might have just passed by.

From ear to ear

18.1 centimeters. That's how long Anthony Victor from our own India has managed to grow his ear hair. It took Victor years of careful maintenance including spending countless hours brushing, shampooing, conditioning and champi-ing to get his ear-mane this long. It's been 9 years since he set the record so it's anybody's guess how long it is now.



Navel Fluff

When he isn't shushing noisy kids at the library where he works as ... well, a librarian, Graham Barker enjoys picking his belly button. While a common vice, Graham's gross passtime doesn't just stop there, he collects belly lint in huge glass jars and true to his librarian nature ... labels them in an orderly fashion. He's now officially held the record for six years.



Chrome OS new design

Chrome OS gets a new Material Design as a part of their latest update.
<http://dgit.in/NewChromeOS>



Android voice recorder

Philips' new SpeechAir gets a taste of android, sporting a camera and a touchscreen.
<http://dgit.in/PhilipsSpeechair>

Unwind

How we unwind



Daredevil

We know, we know, it's been out for a while but most of us have only recently gotten around to watching Netflix's Daredevil and we must say that we're definitely hooked. There are a few who're still holding back but we're certain they'll come around soon. We don't know what Marvel is doing but we're liking it.

Crappy EDM

If you've been reading this section regularly then you'd know that we generally write about one song that managed to crawl into our ears. Alas! This month was ... special. Because we had a new intern who likes EDM, and when we say EDM, we don't mean the one that even remotely passes for music. Pure unadulterated crap!



Jungle Book

The 1967 Disney movie was great, this was even better. Good 3D always makes things better, well almost always. Last we heard, this movie has stayed true to Rudyard Kipling's book. Everyone except Jayesh and Siddharth have watched it so they're missing out on some top quality entertainment.

digit DIARY

Before the month even began Siddharth decided that he'd had enough of the entire magazine drudgery and packed his things to go on a sabbatical. Big plans he had ... said he'll travel the length and breadth of the country ... said he'll travel to Nepal and seek counsel with the revered Buddhist monks at Boudhanath ... said he'll go on a detox spree and work on his fitness. You know where this is going right? The simple reality is that he never left the confines of the city for an entire month and probably spent all his free time staring at the ceiling fan contemplating the nuances of his existence when he wasn't busy posting / sharing every damn link he came across on Facebook. Puppy memes? Check. Political jab? Check. Midnight trolling sessions? Double check!

Bhilai's wunderkid a.k.a. Panigrahi was back in town for a few days to get a proper send-off. Yes, he practically asked for it. And a wonderful send-off he did receive, we spent an entire evening mollycoddling the guy. We took him to a kiddie movie and made the experience as 'fun' as possible.

Babumoshaaaye has been having a horrendous time this month. With fewer people at hand, Abhijit was certainly feeling the pressure and Jayesh and Mithun taking his case in CS:GO was certainly not helping his confidence levels. To make matters worse, he got a call from his college informing him about a goof-up with his results ... which should have come two months back. Having been nearly brought to tears, he had to rush off to Nagpur but

it turned out to be a much needed break from work. Last we heard, he'd been busy 'socialising' with his 'teachers' (read - ass-kissing).

Speaking of CS:GO, our addiction has reached new heights. It doesn't matter what time of the day or night it may be, the moment any one cries or even squeaks the word 'match' all our computers would fire up and the CS:GO anthem would blare through. Given all the beefy speakers hooked up to our machines, we ensured that the entire office knew when we started gaming. And we're pretty certain about that with the office next doors as well. We've even started checking out Pro League matches and strategy videos, CS:GO songs (cy** bl**t) and the whole shebang. Clan Digit is coming to a competition near you!

Manish Rajesh, who'd interned with us ages ago came back for a second round.

The youngling is now a padawan and has

developed an 'am-yeri-kan' accent. He hasn't realised what's coming his way if he keeps this up. Perhaps, next month we might write about what havoc we unleashed upon him.

We've got another intern this month. Say hello to Mehul, who was once unfortunate enough to be a student of Nikhil. Yes, he's that young and has been enjoying his time in the Test Centre. And who wouldn't, there's a 65-inch TV hooked up to a PS4 and he's been gaming ever since. Every day at Digit has practically been a party for him, little does he know our anniversary issue is up next month >:-)





Netflix with HDR

Netflix has just published HDR content on their website starting with Marco Polo.
<http://dgit.in/NetflixHDR>



Uber for auto-rickshaws

Jugnoo just roped up \$10 million funding in series B for the startup.
<http://dgit.in/jugnoo10m>



Every month we recognise the best article written by our community members and publish it here. Keep up the good work, Digitians!

A Guide to Audio connectors and standards

Finding compatible headsets can be a challenge owing to various audio connectors and standards out there. So let this guide help you out!



Sheetal Rao

Last week I was on a hunting spree. The aim was to find the perfect IEM, that could provide decent audio output and fit in my budget as well. I have an iPod (whose headphone have gone missing) as well as an Android smartphone. How difficult would it be to find an IEM that would work with both, quite difficult, apparently. None of them worked properly with both my devices. There

would be an issue with either the remote controls on the IEM or with the microphone. Why should the phone manufacturer decide which headphones I buy even when all of them come with a 3.5mm connector? That was the call, I had to know, WHY!

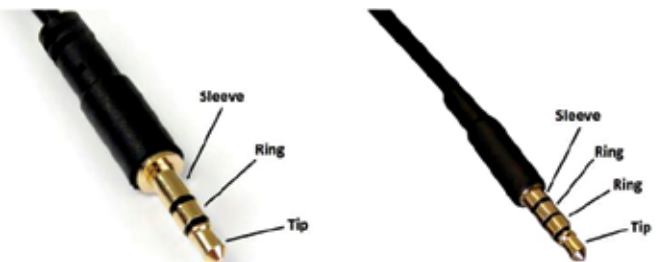
The old school portable music players, like the iPods or MP3 players had a single 3.5mm 3-conductor jack that later went on to become universal. It came into prominence with the first Sony Walkman, which was introduced in 1979. Life was much more simpler before the smartphone era, at least in the audio headset department. A phone audio connector, also known as the phone jack or audio jack is commonly used for analog signals, primarily audio. As our phones and other music devices evolved, so did these plugs and connectors. In due course, many audio connector standards came up and left it to the manufacturers to decide the standard they wanted to adopt. Even though all these plugs are cylindrical in shape, the bands on the plug define the number of contact points and their arrangements.

Understanding TS, TRS and TRRS

Audio connectors come in various sizes, most common ones being the 2.5mm, 3.5mm and 6.35 mm ones. It's easier and more technically accurate to refer to each by their Tip-Ring-Sleeve configuration. The Tip carries the signal and the sleeve or the body provides grounding. The very earlier connectors comprised of the carrying mono sound via the tip and the body i.e. the Sleeve provided grounding, and thus were called the TR connectors.

Later on, rings could be seen added onto the entire arrangement, giving birth to the TRS configuration where rings would be added between the Tip and the Sleeve. The one's with single rings were referred as TRS and dual ones as TRRS. Introduction of rings in the entire assembly made it possible to interchange the

functions between the Tip, the Rings and the Sleeve. For example, in a TRRS arrangement, we could have the Tip carrying the left audio, the first Ring carrying the right audio, the second Ring carrying the microphone signals and the Sleeve would provide grounding or the Sleeve would carry microphone signals and the second Ring would provide grounding.



TRS Audio Plug

TRRS Audio Plug

TRRS Standards

2.5mm and 3.5mm sockets with TRS and TRRS provided mono or stereo sound, a microphone input, and the signaling. The 3-conductor 2.5 mm connectors were on old feature phones, while the four-conductor 3.5 mm connectors were adopted by the newer smartphones. There was no recognised standard that the manufacturers would follow while using the TRRS connectors with three conductor TRS that could be used uniformly.

The four conductors of a TRRS connectors are assigned to different purposes by different manufacturers. Any 3.5 mm plug can be plugged mechanically into any 3.5mm socket, but combinations can be electrically incompatible. Plugging TRRS headphones into a TRS socket or vice versa or plugging TRRS headphones from one manufacturer into a TRRS socket from another may not allow the headphone to function correctly, or at all. Mono audio should always work, but stereo audio and microphone may not, depending on the wiring of the contacts on the socket as well as the connector.

Mainly, There are two different forms of format followed, namely OMTP and CTIA. OMTP stands for Open Mobile Terminal Platform whereas CTIA for Cellular Telephone Industries



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Association. The CTIA has recognised the AHJ, which stands for American Headset Jack wiring arrangement as their standard.

Both of these standards have the left audio wiring connected onto the tip and the right audio on the first ring, for stereo output. The wiring of the microphone and the grounding is where the difference lies.

The OMTP places the microphone on the second ring and the ground on the sleeve. On the other hand, the CTIA standard interchanges the OMTP placement of the microphone and the ground, connecting the ground onto the second ring and microphone to the sleeve.

Standard	Tip	Ring 1	Ring 2	Sleeve
OMTP	Left audio	Right audio	Microphone	Ground
CTIA/AHJ	Left audio	Right audio	Ground	Microphone

If your jack follows the OMTP standard, CTIA connectors will not be completely compatible and function as they should, as their contacts do not align correctly. For eg: Smartphone manufacturer OnePlus follows the OMTP standard for its phones where as Apple follows the CTIA standard for its iPhones. Crazy, isn't it?

Third party headphone manufacturers, thus, produce headsets that follow one of the standards and label the compatibility. Renowned headphone manufacturers like Sennheiser, Bose and others have compatibility charts available on their website. All you need to provide is information regarding your smartphone brand and the specific model, and the website shows the headphones that will be compatible with your device. There are plenty of converters available too, be it for converting OMTP to CTIA or from one size to another and a host of other combinations possible on earth.

Laptops, for the longest time provided (some of them continue to still do so) dedicated 3.5mm jacks for microphone as well as headphone but their slimming down has led to laptop manufacturers to compromise and provide a 3.5mm combo jack.

Types of audio connectors and their uses

The 6.3mm connector was used for years by telephone operators to patch telephone connections together. Also known as the quarter inch jack, this connector is now commonly found on musical equipments, especially in electric guitars and guitar amps. Like the 3.5mm connector and follows the Tip-Sleeve or the Tip-Ring-Sleeve arrangement, but is larger in length and diameter.

One of the most commonly used sizes and follows the Tip-Ring-Sleeve structure, allowing it to carry up to three analog signals at a time. Stereo, microphone-enabled or audio/video versions of this connector have additional rings to carry additional signals.


Banana plugs come in various sizes and have a metal pin that bulges out in the middle, resembling the shape of a banana. They are generally used in pairs and are found on higher-end amps and speakers and are used to connect the two.

Most commonly referred as the audio/video jacks, the RCA connectors are most commonly used to carry audio and video

signals and are 2mm thick. The shell is connected to the outer conductor of the cable providing electrical ground whereas the center pin of the plug is connected to the cable conductor that carries the signal. The RCA cables are color-coded, where yellow is for composite video, red is for right audio channel and white for the left channel of stereo audio.

Developed by Toshiba, optical interface for digital audio signal is called TOSLINK. It is a round optical connector housed in a rectangle connected body and was originally intended for use solely with Toshiba CD players. Later on, it was adopted by several manufacturers and has gone to become standard equipment on many audio/video sources, receivers and surround sound equipment. TOSLINK uses fiber optic cable but is limited to a maximum cable length of about 5 meters.

S/PDIF is another type of digital audio cable format that stands for 'Sony Philips Digital Interface' and can be used along with optical fiber connectors such as TOSLINK which converts the S/PDIF signal to light for transmission or with coaxial connectors like the RCA using adapters.

XLR connectors are circular in shape and are used for professional audio applications. The most common configuration for an XLR connector is 3-pin where the first pin provides grounding, the second one is the positive polarity terminal and the third is negative, to provide balanced audio signals. 



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